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SOLID WASTE MANAGEMENT PLAN



SACRAMENTO COUNTY SOLID WASTE MANAGEMENT PLAN
AMENDMENT NO. 2 DATED AUGUST 12, 1976

The following modifications have been made to the Sacramento County Solid Waste Management Plan. These modifications are to be inserted by all holders of either the abridged or unabridged versions of the Final Plan dated April 1976.

Amendment No. 2 contains two parts (A and B) describing separate actions as follows:

- A. The following four items refer exclusively to the City of Sacramento. Items 1, 2, and 3 are additions to the plan which clarify the intent of the city. Item 4 is a change to the time schedule and method of financing contained in the final plan dated April 1976.
 - 1. The city will retain ownership of its landfill property and its ultimate use will be decided by the city.
 - 2. The city will continue to operate its landfill to its completion and upon its completion will deliver to the JPA a completed transfer station and its associated transfer vehicles.
 - 3. The city will not provide additional funds to the County Health Department.
 - 4. The city will not impose a gate fee at its landfill site on January 1, 1977.
- B. Plan Amendment No. 1 dated June 18, 1976 is deleted in its entirety. The items first documented in the April 1976 plan and modified by Amendment No. 1 are reinstated.

**SACRAMENTO COUNTY
SOLID WASTE
MANAGEMENT PLAN
FINAL**

APRIL 1976

Prepared by:

**COUNTY OF SACRAMENTO
DEPARTMENT OF PUBLIC WORKS
DIVISION OF SOLID WASTE
MANAGEMENT**

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BACKGROUND

The Santa Clara Mountains and National Forest are located in the California State Legislature during the 1970s. At that time, the first study in the state was completed, which was the first study of the Santa Clara Mountains National Forest and National Forest.

PURPOSE

The purpose of this plan is to develop a comprehensive land management system of resources for the Santa Clara Mountains National Forest and National Forest.

This plan provides policy guidance for managing present and future land management resources, including the management of the Santa Clara Mountains National Forest and National Forest, and the Santa Clara Mountains National Forest. The plan also provides policy guidance for managing present and future land management resources, including the management of the Santa Clara Mountains National Forest and National Forest.

Chapter 1

Introduction & Methodology

BACKGROUND

The Solid Waste Management and Resource Recovery Act was enacted by the California State Legislature during 1972. As a result of that Act each county in the state must prepare a solid waste management plan and submit it to the Solid Waste Management Board prior to January 1, 1976.

PURPOSE

The purpose of this plan is to develop a comprehensive solid waste management system as required by state law to serve the local needs of Sacramento County.

This plan provides policy guidance for solving present and future solid waste management problems involving the unincorporated area of the County, the cities within the County, and to a small degree, the greater Sacramento Metropolitan Region: Regional aspects of solid waste management are considered as they relate to the problems of the County. This

guidance is in the form of goals and objectives, policy statements, and well-defined alternative action programs covering the full breadth of solid waste activities (i.e. generation through disposal and/or recovery).

The details of solid waste management needs and actions are presented for the short term (1976-1980), medium term (1980-1990), and long term (1990-2000). Consideration is given to community needs and to public-private industry interface in meeting those needs.

SCOPE

The scope of the study can be described in terms of the following major tasks:

1. Inventory of existing information and facilities - survey of existing studies, plans, background material; review of existing disposal sites, transfer stations, collectors and their equipment; and other factors.
2. Projections of growth and waste volumes - compilation of population, land use, and growth data to establish growth projections; review of existing solid waste quantities and characteristics; and projection of future population and solid waste generation data.
3. Problem identification - detailed studies of the existing system; interviews with private and public collectors; and contact with appropriate local, state and regional agencies.
4. Development of alternative plans - formulation of specific alternatives to solve reported problems; development of design and cost estimate criteria; and the application of design and cost estimates to the alternatives.
5. Evaluation of alternative plans - compared on the basis of economic, environmental, agency, and solid waste management system impacts.
6. Selection of the recommended plan - the most suitable plan for short- and long-term needs of the area was selected based on

state requirements, local needs, and impact data; principal features of transfer, processing and disposal are detailed; and project staging, cost estimates and implementation procedures have been developed.

7. The planning document - represents a comprehensive discussion of the findings and conclusions resulting from the planning study and a statement of planned activities.

LOGISTICS

On March 25, 1974, the Board of Supervisors designated the Department of Public Works as the agency responsible for the development of Sacramento County's Solid Waste Management Plan. Immediately thereafter an ad hoc committee, composed of members from private and public agencies and community groups was formed to provide guidance during plan preparation. The ad hoc committee recommended that two committees be formed for plan preparation: a Technical Review Committee (TRC), composed of twelve members, which was appointed on September 25, 1974, by the Department of Public Works; and a 14 member Citizens Advisory Committee (CAC), which was appointed on October 21, 1974, by the Board of Supervisors. A consulting firm (Bartle Wells Associates) was selected to conduct the financial and administrative analyses of alternative plans developed through the combined efforts of the planning staff, TRC, CAC, and the general public. The roles of the committees, the planning staff, and consulting firm were as follows:

- o *Role of TRC - To advise Public Works during plan development on technical matters and to provide guidance for plan review and acceptance;*
- o *Role of CAC - To suggest policy and advise staff on matters of public concern;*
- o *Role of Planning Staff - To analyze, document, and evaluate solid waste management problems that exist in the County, coordinate input from all sources, develop alternative action programs, and prepare the planning document; and*

- o *Role of Consulting Firm - To provide financial and administrative analyses of the existing solid waste systems, the proposed alternative systems, and to support these analyses at public hearings.*

Compatability with Related Plans. Local and regional general plans and plan elements related to solid waste management planning were reviewed. These included general plans of the County, its four cities, and SRAPC. As a result of this review, it is believed that this solid waste management plan is compatible with the requirements, goals, and objectives of these Sacramento area plans. Additionally, the Comprehensive Water Quality Control Plan and the State Ambient Air Quality Standards Plan were reviewed. Summaries and excerpts of these plans are presented in Chapter 3.

Plan Review. The plan was under continual review by the TRC during developmental stages. Private industry, as well as public agencies, were represented on the TRC and thus had direct and continuous opportunity for input into the planning process. The consulting firm provided financial and administrative analyses, review, and criticism, during the study period.

Agency Participation. Interested local and regional agencies were represented on the TRC. State boards and/or agencies were periodically advised of planning process and sent draft copies of the plan at various stages of development (the first draft was sent in March, 1975). Agency representatives from counties contiguous to Sacramento County met periodically to discuss inter-county planning coordination. The State Solid Waste Management Board provided continual liaison during the study period.

Public Participation. The public participated in the preparation and review of the Sacramento County Solid Waste Management Plan in a number of ways: (1) the planning staff worked closely with a 14-member Citizens Advisory Committee appointed by the Board of Supervisors; (2) presenta-

tions were made to many community groups (Rotary, Lions, etc.) in an effort to solicit comments from the public at large; (3) media presentations (T.V., newspapers) on planning programs were made periodically to insure the widest broadcast of ongoing planning activities; and (4) numerous presentations were made at hearings which were open to the public.

Political Participation. Presentations were made early in the planning process to city council members from Folsom, Isleton, and Galt (FIG) meeting in joint session. Several presentations were made to the Sacramento City Council and Sacramento County Board of Supervisors. The purpose of the presentations was to provide these political bodies with a clear definition of problems and potential solutions early in the planning process, to seek direction, and to plan accordingly with the ultimate goal of developing a final planning document for adoption by resolution.

PLAN METHODOLOGY

The planning methodology contained four steps:

- Step (1) The planning staff divided the solid waste management system into the following problem areas: generation, storage, collection, transfer, recovery, disposal, special wastes, administration and control. This step was accomplished through research and development, analysis of local needs, and assessment of State mandates and guidelines.
- Step (2) The planning staff investigated, tabulated, and summarized data regarding planning area characteristics, refuse quantities, refuse projections, and the existing solid waste management system. This was accomplished through field studies, inventories, research, questionnaires, phone calls, and various other means.
- Step (3) The planning staff interacted with citizens, technical experts, industry, the military, and official agencies. This was accomplished through participation by repres-

entatives of these groups on the Technical Advisory Committee and a Citizen Advisory Committee.

- Step (4) The planning staff evaluated the problem areas and developed solutions and alternative solid waste management systems. These alternatives were then presented to local political bodies for program review and selection.

Chapter 2

Summary Of Findings & Recommendations

INTRODUCTION

The programs contained in this plan cover a wide variety of solid waste management functions which include waste generation, storage, collection, transfer, processing, recovery, disposal and special wastes. They affect a broad spectrum of public and private jurisdictions which include private-industry collectors; the cities of Sacramento, Folsom, Galt and Isleton; the County of Sacramento; the general public; and, to a limited degree, the surrounding region.

This chapter summarizes major findings; lists goals, objectives, policies and planning priorities; and describes the solid waste management alternatives developed as potential courses of action for the County. The planned programs are summarized in terms of facilities, waste flow, implementation schedules, financing arrangements, administration and other important impacts.

It is intended that this chapter provide the reader with only a conceptual familiarity with the planning process. For an understanding of plan development and related decision making the reader should review Chapter 1. For comprehensive analyses and justifications the reader should review other appropriate chapters in this planning document. For a detailed discussion of planned programs the reader should review Chapter 10.

FINDINGS

A number of significant findings made during the planning process are discussed by major solid waste management function as follows:

Solid Waste Management

- o During 1975 the residents within Sacramento County and the cities therein expended an estimated \$14,273,000 for solid waste management activities, both public and private, which financed all collection, transfer, disposal, processing, administrative and planning functions. Approximately two-thirds of this expenditure was public; and*
- o Sacramento County has two general demographic areas: A highly urbanized area north of Calvine Road and a rural agricultural area south of Calvine Road. The financing of waste management systems for each area must be a joint activity.*

Waste Generation

- o During 1975 the annual quantity of solid waste generated in all categories within Sacramento County was estimated to be 2,358,270 tons. This is divided among four categories as follows:*

<i>a.</i>	<i>Municipal</i>	<i>540,420 tons</i>
<i>b.</i>	<i>Industrial</i>	<i>77,780 tons</i>
<i>c.</i>	<i>Agricultural</i>	<i>1,505,740 tons</i>
<i>d.</i>	<i>Special Wastes:</i>	<i>234,330 tons</i>

<i>TOTAL</i>	<i>2,358,270 tons</i>
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- o The per capita waste generation rates for municipal waste range from 1.04 tons per capita per year in the urban areas to 0.36 tons per capita per year in rural areas.
- o In the year 2000 it is estimated that Sacramento County will generate 2,714,410 tons of solid waste;
- o Local government is not in a position to change consumer habits which create the conditions of waste generation; and
- o Negligible changes will occur in waste generation practices through the year 1980.

Waste Storage

- o During 1975 there were approximately 192,000 locations in the County where waste was stored and actively serviced by a refuse collection company; approximately 8,500 of these were commercial accounts and the remainder were for single- and multiple-family dwellings; and
- o Adequate regulations for the storage of solid wastes are necessary to prevent litter, pest and health problems and to assure the proper location, sizing, and cleaning of storage containers.

Waste Collection

- o Approximately 80% of the solid waste management dollar is expended for the collection of solid waste; approximately 60% of the collection dollar is expended on labor;
- o Solid waste collection services are provided in the County by 24 companies, both public and private, which employ 516 men full-time and 28 men part-time in the operation of 236 vehicles; and
- o Problems of collection have been adequately dealt with in the past and this is expected to continue into the future.

Waste Transfer

- o Under certain conditions a transfer station can reduce the costs of transporting refuse between a collection area and a processing or disposal facility; and
- o There are two transfer stations currently serving the citizens of Sacramento County. More transfer stations will be required prior to 1980 to meet the needs of the County.

Waste Processing

- o During 1975 approximately 58,000 tons of material were diverted to recycling in Sacramento County and its cities.

Waste Disposal

- o The Countywide solid waste management system lacks an overall Countywide disposal policy;
- o Landfill sites for disposal of solid wastes will be required into the next century;
- o Six solid waste disposal sites are currently in existence to meet the needs of the residents of the County; and
- o A new disposal site for demolition waste materials must be established by 1977.

Special Wastes

- o The handling of discarded automobile and truck tires requires special attention;
- o Handling of hazardous waste is a potential problem in Sacramento County; and
- o Litter is a continuing problem.

Financing

- o The existing system is supported through user fees or service charges levied by private and public service agencies;
- o Tax dollars for financing resource recovery facilities are scarce; and
- o Any major resource recovery venture will require major capital formation which would affect service rates.

Legislation

- o State Solid Waste Management standards are comprehensive and should be adopted locally.

Regulation

- o The cities must decide who will regulate solid waste management matters within the limits of each city; and*
- o The regulation of solid waste activities must be upgraded and expanded to provide for an efficient solid waste management and waste recovery system.*

GUIDELINES

The goals, objectives, mandates, and priorities which provided guidance and set constraints on the development of alternatives are as presented below:

Goals

- o Sacramento County's solid waste management program must provide systematic and economical control of the storage, collection, transport, separation, processing, recycling, recovery and disposal of solid waste on a Countywide basis, in a manner that provides maximum protection of the environment.*

General Objectives

- o Eliminate health and safety hazards;*
- o Reduce and progressively eliminate environmental degradation caused by solid waste - from generation to disposal;*
- o Minimize service costs compatible with the goals;*
- o Coordinate solid waste management with land use planning and with overall environmental improvement programs, including air, water, and land quality management; and*
- o Practice resource recovery to the maximum degree economically feasible.*

Specific Objectives

- o Establish and maintain an equitable, efficient program to coordinate collection of solid waste on a Countywide basis;*

- o Organize operations required to manage, administer, and enforce existing and new legislation, and to carry out necessary physical operations;
- o Provide required capital and operations financing;
- o Establish and maintain an equitable system of long-range financial support for the solid waste management program;
- o Undertake rapid implementation of the expanded and improved solid waste management system;
- o Implement resource recovery at the earliest possible time;
- o Reduce the total number of land disposal sites; and
- o Minimize the environmental impact of land disposal sites by adhering to the highest possible operations standards.

State Policy

- o The Solid Waste Management Board has established a statewide goal to reduce by 25% the quantity of waste entering landfills by the year 1980.

Priorities

Because of the large number of solid waste management problems to be solved, an order of priorities was established to guide plan preparation.

The priorities are presented in descending order from highest to lowest:

- o The highest priority was given to the development of significant levels of resource recovery because of state mandates and citizen demands;
- o The development of adequate and appropriate disposal because of the imminent closing of all County landfills except the Kiefer landfill;
- o The development of transfer stations;
- o The development of systems for handling special wastes because of state mandates concerning litter and hazardous wastes, and because of serious local deficiencies in data and programs related to those wastes;
- o A low priority was given to the development of systems for the collection of waste because the collection system is functioning well, and state mandates and citizen concern are absent; and

- o *The lowest priority was given to the development of systems which would reduce waste generation at the source because of the frustration of not being able to accomplish anything in this regard at the local level.*

THE ALTERNATIVES

Five alternatives were developed for managing the solid wastes generated in the County. These alternatives fall into two categories: 1) continued landfilling of all wastes with a series of transfer stations, and 2) resource recovery with landfilling of residues.

Before discussing individual alternatives a basic resource recovery program common to all alternatives is presented.

Basic Resource Recovery Program

A basic resource recovery program was developed by the Citizen Advisory Committee (CAC). This program can be implemented concurrently as a supplement to any one or all of the five alternatives listed below. The program is designed to place responsibility for home separation with individual homeowners on a voluntary basis. Recommendations contained in this program affect recovery of newspaper, glass, mixed metals, compost and major processing systems. The CAC gives priority to those recovery programs that can be implemented at the least cost, and believes that recycling, reuse and composting will soon prove to be or are already cheaper than disposal at sanitary landfills. The program is discussed in detail in Chapter 8 and is completely described in Appendix N.

Individual Alternatives

The following two alternatives would provide for continued landfilling of all wastes:

Alternative 1A (Limited Transfer). This alternative proposed building three new transfer stations and expanding the existing North Area Transfer Station. Under this alternative all City of Sacramento waste would be

direct hauled to a remote landfill. The landfill could be a new facility constructed for the City of Sacramento, the County landfill, or the Yolo Regional landfill.

Alternative 1B (Comprehensive Transfer). This alternative proposed building four new transfer stations and expanding the County's existing North Area Transfer Station. Under this alternative a transfer station is planned to handle all of the city's waste.

The following three alternatives would provide different levels of resource recovery:

Alternative 2A (Limited Materials Recovery). This alternative proposed a processing station to mechanically remove ferrous material from about 74 percent of the County's municipal waste stream. Approximately 5% of the processed waste would be recovered. Waste would reach the processing station from a series of transfer stations located through the County. The remaining 26 percent of the waste stream would be direct-hauled to the County landfill without processing.

Alternative 2B (Comprehensive Materials Recovery) This alternative proposed that 100 percent of the municipal waste stream would pass through a processing station. Glass, ferrous metal and aluminum would be mechanically recovered to produce a 15% reduction of waste for disposal. Waste from the same transfer stations proposed for Alternative 2A would be transferred to the processing facility and would provide about 70 percent of the processable waste. The remaining 30 percent would be hauled directly to the processing station.

Alternative 2C (Materials and Energy Recovery) This alternative proposed that the municipal waste stream go through two steps for resource recovery. Step 1 would be milling and materials separation as proposed in alternative 2B. Step 2 would involve incineration of processed waste to produce steam.

All of the County's municipal waste would go through these two steps.

PROPOSED PROGRAMS

The programs of the plan will resemble either the 1B or 2B alternative depending on a JPA decision to be made in 1977.

The primary implementing vehicle for most of the major actions proposed by this plan will be a countywide joint powers authority. The participants in the formation of the JPA will negotiate a contract establishing the policy-making and operating procedures. The following summarizes JPA formation and implementation of proposed programs.

JPA Implementation

Plate 2-1 shows the JPA's programs implemented in three phases. In Phase 1, the County and cities would form a joint powers authority to plan and implement countywide transfer, disposal and resource recovery.

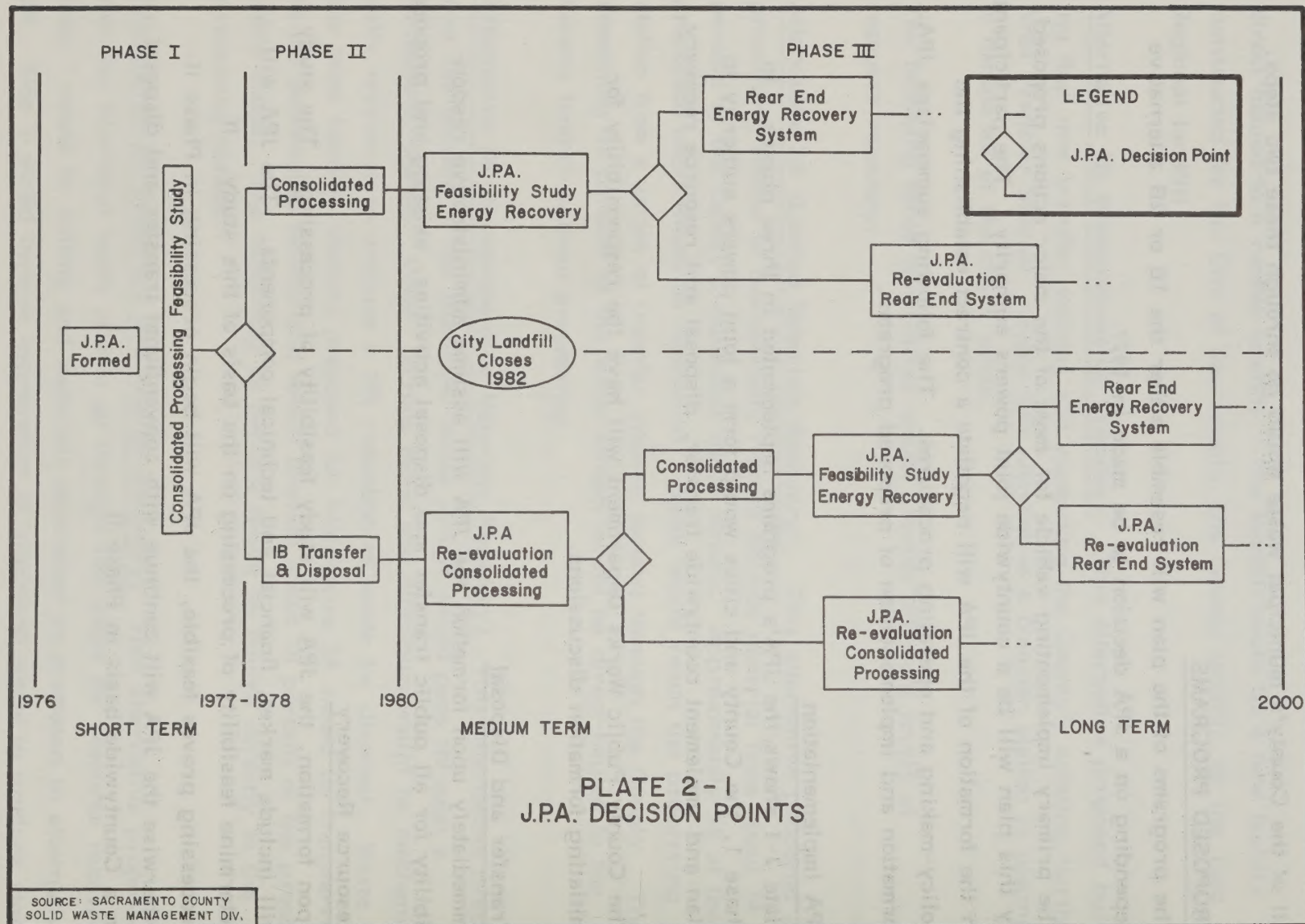
The County Public Works Department will have the responsibility for initiating formation discussions.

Transfer and Disposal

Immediately upon formation the JPA will assume administrative responsibility for all public transfer and disposal activities, existing and proposed.

Resource Recovery

Upon formation, the JPA will study feasibility of processing. The study will include market, financial and technical components. The JPA will determine feasibility of processing on the basis of this study. If processing proves feasible, the JPA will begin processing in Phase II. Otherwise the JPA will continue with conventional transfer and disposal on a Countywide basis in Phase II.



Processing is only a first step toward full scale resource recovery. Periodic evaluation of energy recovery and other rear-end systems would occur after processing is established. Plate 2-1 shows continued re-evaluation of full scale resource recovery.

Conventional Facilities

Even without resource recovery the JPA will be concerned with construction and operation of transfer stations and landfills. Of major importance will be transfer stations to serve unincorporated areas and a facility to replace the City of Sacramento landfill. Planning for replacement facilities for the City of Sacramento landfill will occur immediately upon formation of the JPA.

JPA CASH FLOW 1976/82

Table 2-1 summarizes the expenses for Countywide disposal and transfer. These include all special programs described in Chapter 10, as well as construction and operation costs of proposed and existing facilities. Included in construction costs is a city landfill replacement estimated at \$2.5 million in 1981/82. Expenses shown in Table 2-1 are subject to negotiation and will be factors for discussion during JPA formation.

Table 2-2 shows the effect of these expenses on average transfer and disposal gate fees. The table shows that a \$5.75 average gate fee would be adequate to cover all operation, capital accumulation and special program costs in 1982. The table does not include the capital cost of a processing station. A possible cash flow for such a station is shown in Chapter 9.

In Table 2-2, the \$5.75 is an average gate fee only. The plan does not preclude setting different gate fees at landfills and transfer stations. The specific rate structure is one issue to be resolved by the JPA Board of Directors.

TABLE 2-1

EXPENSES FOR COUNTYWIDE DISPOSAL
AND TRANSFER (\$000)¹

	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
<u>Special Programs³</u>						
Waste inventory	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0
Disposal site policy	5.0	--	--	--	--	--
Gas & leachate monitoring	10.0	5.0	5.0	5.0	5.0	5.0
Final use at landfills	5.0	--	--	--	--	--
Close completed landfills	--	5.0	--	--	--	--
Class III disposal study	10.0	--	--	--	--	--
Litter control	10.0	--	--	--	--	--
Separate collection of recyclables	20.0	--	--	--	--	--
Efficiency of collection	--	10.0	--	--	--	--
Materials used and reuse	20.0	20.0	20.0	20.0	20.0	20.0
Hazardous waste inventory	5.0	5.0	5.0	5.0	5.0	5.0
Scrap tire study	--	10.0	--	--	--	--
Total	\$ 95.0	60.0	35.0	35.0	35.0	35.0
<u>Design and Construction</u>						
North area expansion	\$ 20.0 ⁴	\$ 500.0 ⁵	\$ --	\$ --	\$ --	\$ --
City replacement facility	--	--	--	--	--	2,500.0 ^{4,5}
South area station	--	--	--	--	--	--
Elk Grove station	--	20.0 ⁴	500.0 ⁵	--	--	--
Walnut Grove station	--	--	--	--	--	--
Total	\$ 60.0	\$ 520.0	\$ 500.0	--	--	\$2,500.0
<u>Operations^{6,7}</u>						
Disposal - City Landfill	\$ 84.4	\$ 170.0	\$ 171.4	\$ 172.7	\$ 174.4	\$ 176.0
County Landfill	329.6	669.9	696.8	833.3	844.6	856.1
North area station	398.8	808.4	819.4	830.5	841.9	853.3
South area station	187.8	377.2	378.7	581.7	587.8	593.7
Elk Grove station	--	--	78.4	160.0	163.9	167.9
Walnut Grove station	30.5	61.1	61.8	61.4	61.6	61.6
Total	\$1,031.0	\$2,086.6	\$2,206.5	\$2,639.6	\$2,673.9	\$2,708.6

1 - All costs in 1975 dollars.

2 - Assumes operation from January 1977.

3 - Special programs described in Tables 10-1 to 10-11.

4 - Design cost.

5 - Construction cost.

6 - All operations costs include depreciation to fund capital replacement.

7 - Increases in operation costs reflect increased waste flows only--no inflation.

TABLE 2-2

**SUMMARY OF CASH FLOW FOR FORMATION, OPERATIONS CAPITAL ACCUMMULATION
AND SPECIAL STUDIES OF JOINT POWERS AUTHORITY¹ (\$000)**

	1976/77 ²	1977/78	1978/79	1979/80	1980/81	1981/82
Wasteflow (Total City and County)	168.8	545.1	562.4	580.1	588.0	596.0
Gate Fee ³	5.75	5.75	5.75	5.75	5.75	5.75
REVENUES						
Gate Fees	1,545.6	3,134.3	3,233.8	3,335.6	3,381.0	3,427.0
EXPENSES						
Negotiation	10	-	-	-	-	-
City Landfill Replacement Study	25	-	-	-	-	-
Processing Feasibility Study	200	-	-	-	-	-
Ongoing Energy Recovery Study	-	5	5	5	5	5
Special Programs (Table 10-12)	95	60	35	35	35	35
Design and Construction (Table 10-12)	60	520	500	-	-	2,500
Operations (Table 10-12) ⁵	<u>1,031.1</u> <u>1,421.1</u>	<u>2,086.6</u> <u>2,671.6</u>	<u>2,206.5</u> <u>2,746.5</u>	<u>2,639.6</u> <u>2,679.6</u>	<u>2,673.9</u> <u>2,713.9</u>	<u>2,708.6</u> <u>5,213.6</u>
ACCUMULATION FUND						
Net Revenues (debit)	124.5	462.7	487.3	656.0	667.1	(1,786.6)
Capital Accumulation ⁴	124.5	595.9	1,124.9	1,859.6	2,656.9	870.3

1 - All costs in 1975 dollars

2 - Assumes operation from January 1977

3 - Average gate fee - not meant to preclude differential rates at different facilities

4 - Capital accumulation fund earns 7% on minimum balance

5 - Assumes JPA operates all landfills and transfer stations

Source: Staff and Bartle Wells

Effect of Proposed Programs on Service Charges

Collection service rates are dependent upon operating costs which are derived by summing haul costs, disposal costs, and collection costs. The plan envisions no immediate changes in collection costs or haul costs. It does, however, propose an increase in disposal costs (via a disposal charge increase) as a way to finance a city landfill replacement study and/or facility, future transfer stations, and special programs. This increase in disposal charges would result in a collection service charge increase.

Table 2-3 estimates the increase in collection service rates associated with the plan. It assumes that all landfills and transfer stations charge the full average disposal gate fee shown in Table 2-2.

Action by many different public agencies as well as by private industry is required to accomplish the many tasks and projects in this plan. The following general division of responsibility among public agencies and private industry is made to arrive at planned objectives.

- o *County Department of Community Health - This department will be the enforcing agency for state and local solid waste health standards.*
- o *Solid Waste Management Division (SWMD) - Sacramento County's public works department will enforce Solid Waste Management operating standards in the unincorporated area. They will design, and construct transfer facilities as well as conduct special studies to improve planning in solid waste management. The SWMD will be responsible for periodically updating this planning document. This agency will provide coordination of litter and hazardous waste programs as well as regulation of private industry collection in the unincorporated areas.*
- o *The cities - The cities will retain responsibility for SWM operating standards in their jurisdictions and will retain control over city collection.*
- o *The solid waste planning committee - A solid waste planning committee will be designated by the Board of Supervisors and the cities as an advisory committee on solid waste management. The committee will have representatives from the County, the cities, private industry and citizens.*

TABLE 2-3
EFFECT OF PLANNED PROGRAMS
ON RESIDENTIAL SERVICE CHARGES^{1,2,3}

Service Area	Service Charges		Disposal Gate Fees	
	Current ⁴ \$/Month	1977-1982 \$/Month	Present ⁵ \$/Ton	1977/1982 ⁶ \$/Ton
City of Sacramento	\$4.00	\$4.60	\$1.20	\$5.75
North Area of County	4.40	4.90	2.28	5.75
Folsom	3.50	4.10	1.50	5.75
Isleton	3.25	3.50	4.00	5.75
Galt	3.75	4.00	4.00	5.75
Elk Grove	3.25	3.50	4.00	5.75
Other Unincorporated	3.25 to 4.00	3.50 to 4.25	4.00	5.75

1 - This table assumes no changes in haul costs or collection costs. It also assumes that the full average gate fee shown in Table 10-13 is charged at landfills. Please see the text for a fuller explanation.

2 - All costs in 1975 dollars.

3 - Impact assessed by converting monthly charges to charged per ton on the basis of 1.61 tons per single family dwelling per year.

4 - Charges for two-can-per-week service (Jan., 1976).

5 - Taken from Chapter 8.

6 - Average gate fee only.

Source: Staff and Bartle Wells

- o *Joint powers agency - a County-wide joint powers agency will administer and operate transfer, disposal, and recovery facilities. This authority will guarantee the flow of waste and regulate gate fees at all disposal sites. This authority may finance and operate resource recovery facilities.*
- o *Private industry - Private industry operates many solid waste facilities in the County. It will have a substantial voice in the solid waste planning committee. It will be provided the opportunity to construct and operate facilities.*

Impacts of Proposed Programs

Table 2-4 shows a summary of economic, environmental, and solid waste system impacts by jurisdiction as they relate to the cities, the County, and private industry.

MISCELLANEOUS PROGRAM STATEMENTS

There are a number of activities of low economic impact which must be conducted in the near term to upgrade the Solid Waste Management System and to begin the activities for implementation of resource recovery programs. These activities are listed below as program intent statements.

- o *The County and cities will propose and/or support legislation at the state level to regulate non-returnable containers, either through prohibition, tax, or deposit.*
- o *The County and cities will propose and/or support public education programs at the state level aimed at source reduction.*
- o *The County and cities will take the initiative in developing local control and educational programs which will serve to solve Countywide solid waste management problems and help to conserve material and energy resources and foster community support.*
- o *The County and cities will develop a plan for the ultimate land use for all sanitary landfills, both existing and proposed. This plan will be based on a near term study to be conducted by the Countywide J.P.A.*
- o *The County and cities are committed to the principle of resource recovery and will investigate the various levels of activity which may result in the improvement of this program area. In this regard the County will conduct a*

TABLE 2-4

SUMMARY OF IMPACTS

Jurisdiction	Major Impacts
Unincorporated Area of Sacramento County	- o Service rates for collection and disposal will increase - o Cooperative ventures between the cities and County will require joint administrative and financing obligations - o JPA will operate proposed transfer stations and disposal sites - o Citizens of the County will have close and easy access to all disposal facilities - o Potential for future energy recovery is provided.
Sacramento City	- o City landfill will be exhausted sometime after 1982, a joint powers authority agreement between the cities and County will evaluate and determine solution to this city disposal problem - o JPA will operate the city landfill - o Service rates for collection and disposal will increase - o Potential for future energy recovery is provided
Galt	- o Provides disposal and recovery through the year 2000 - o Provides transfer station to replace Elk Grove disposal site - o Service rates for collection and disposal will increase
Folsom	- o Provides disposal and recovery service through the year 2000 - o Service charges for collection and disposal will increase

TABLE 2-4 (Continued)

Jurisdiction	Major Impacts
Isleton	- o Provides disposal and recovery through the year 2000 - o Provides transfer station to replace disposal site - o Service rates for collection and disposal will increase
Private Industry	- o Opportunity to finance and operate future facilities is provided - o Provides a series of easily accessible transfer stations - o Disposal gate fees will increase

- "home separation of recyclable materials" study in a near term.
- o The County and cities recognize disposal as a high priority area of concern; thus, the J.P.A. will conduct the following activities in the near term:
 - a. Establish guidelines and policy for all disposal operations.
 - b. Study Class I, II and Class III disposal site potential and needs Countywide.
 - c. Develop gas and leachate monitoring systems at all long term County and city landfills.
 - d. Develop a land reclamation plan for the entire County for the purpose of providing adequate Class III disposal capability and returning blighted land to productive use.
 - e. Develop an orderly plan for the redistribution of wastes which will be necessitated as various landfills become exhausted or are closed for other reasons.
 - o The County and cities generally recognize the need for mandated collection service on a Countywide basis.
 - o The County and cities will propose and/or support such measures which will guarantee the effective and efficient operation of public and private solid waste activities; this may include owner mandated collection service and tax lien procedures for recovering delinquent monies.
 - o The County and cities are committed to developing uniform exemption procedures to assure fair treatment of private citizens in regard to any mandated activities. The County will study this area of concern and develop guidelines in the near term.
 - o The County and cities fully recognize the needs to regulate private solid waste handling activities in the County and the need for information concerning solid waste quantities and movement for the purpose of future planning.
 - o The County and cities are concerned about the lack of knowledge as to the type, quantities, and movement of hazardous waste thus a monitoring program will be developed in the near term.

- o The County and cities recognize the state mandates to provide effective litter and hazardous waste control activities. The County and cities believe that their current litter and hazardous waste programs require upgrading. The County will study this area and propose necessary action in the near term.
- o The County and cities will adopt state solid waste standards and will formulate and implement in ordinance form local standards regarding solid waste generation, storage, collection, transfer, transport, processing, and/or recovery in the near term.
- o The County and cities are committed to community and interdisciplinary participation in the planning stages of solid waste management activities; thus, the County and cities will organize citizen and technical input committees.
- o The County and cities recognize the need to consider regional solutions to solid waste management problems; thus, where a multi-jurisdictional or regional approach to a solid waste problem is shown to be advantages to the County and cities, it will be adopted.
- o The County and cities recognize the need for well organized comprehensive ordinances and see a need for coordination in this regard between the cities and the County. The County will pursue this matter in the near term.

SUMMARY OF FACILITIES

FACILITIES WITH MAJOR IMPACTS

Projects Assumed to be Constructed

Several major facilities currently planned or under construction were assumed to be completed as planned. These projects are funded and in various stages of development.

- o Fruitridge Transfer Station. This station is designed to meet disposal needs in the central County and south city area by 1976.
- o Locke Transfer Station. This station will replace the Grand Island Disposal site and meet the disposal needs of the Delta area.

Projects Planned to be Constructed

- o North Area Transfer Station. Expansion of this facility will be required by 1979.
- o Elk Grove Transfer Station. Disposal Facility to replace exhausted Waterman landfill serving the Galt-Elk Grove area by 1979.

Planned Projects/dependent on JPA Decision

- o Northeast Transfer Station. Would provide disposal point for North East County residents after the termination of direct haul to the County landfill by 1980.
- o Consolidated Processing Station. Could receive and process 100 percent of the County's municipal waste providing materials recovery.
- o City Transfer Station.

Projects Recommended for Future Consideration

- o Class III Disposal Site. Study to determine location and size requirements for a construction and demolition disposal site to replace the exhausted Waldon's landfill by 1977.
- o Class I Disposal Site. Study to determine the need and potential for hazardous waste disposal in Sacramento County 1976-78.

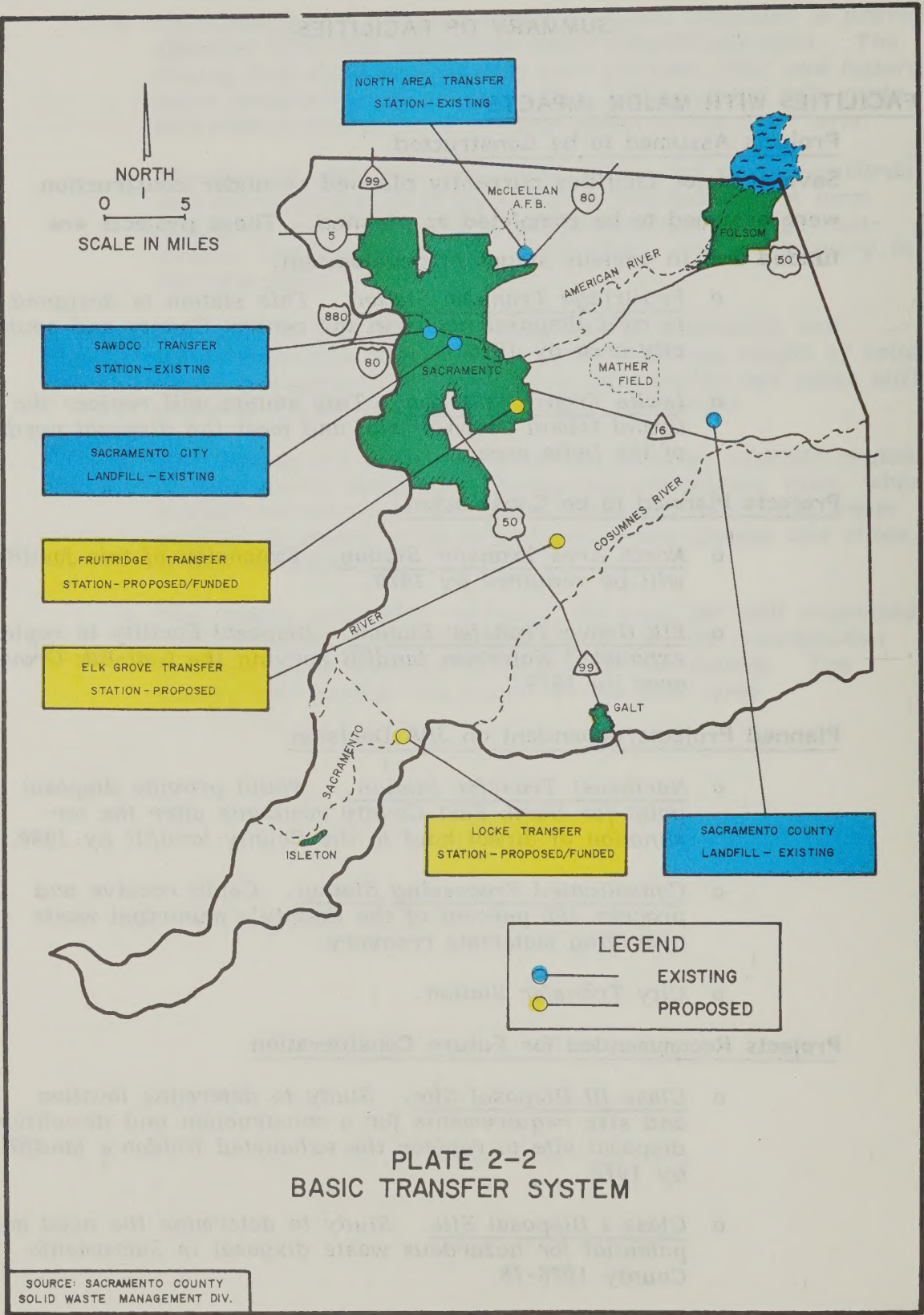


PLATE 2-2
BASIC TRANSFER SYSTEM

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

TRANSFER AND DISPOSAL

Facility	1975	1976	1977	1978	1979	1980	1981-1990	1991-2000
North Area Transfer	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved
Fruitridge Transfer		Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved
Locke Transfer		Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved
Elk Grove Transfer					Proposed	Proposed	Proposed	Proposed
Northeast Transfer ¹						Proposed	Proposed	Proposed
City Transfer ¹						Proposed	Proposed	Proposed
County Landfill	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Processed Refuse or Residue Only	Processed Refuse or Residue Only	Processed Refuse or Residue Only
City Landfill	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	Processed Refuse or Residue Only		
Waterman Landfill	Existing or Approved	Existing or Approved	Existing or Approved	Existing or Approved	(Replaced By Elk Grove Transfer Station)			
Grand Island Disposal	Existing or Approved	(Replaced By Locke Transfer)						
14 th Avenue	Existing or Approved	(Replaced By New Class III Site)						
Class III Site		Proposed	Proposed	Proposed	Proposed	Proposed	Proposed	Proposed

RESOURCE RECOVERY

Facility	1975	1976	1977	1978	1979	1980	1981-1990	1991-2000
Consolidated Processing ¹						Proposed	Proposed	Proposed
Rear End System ¹							Proposed	Proposed

 Existing or Approved

 Expansion

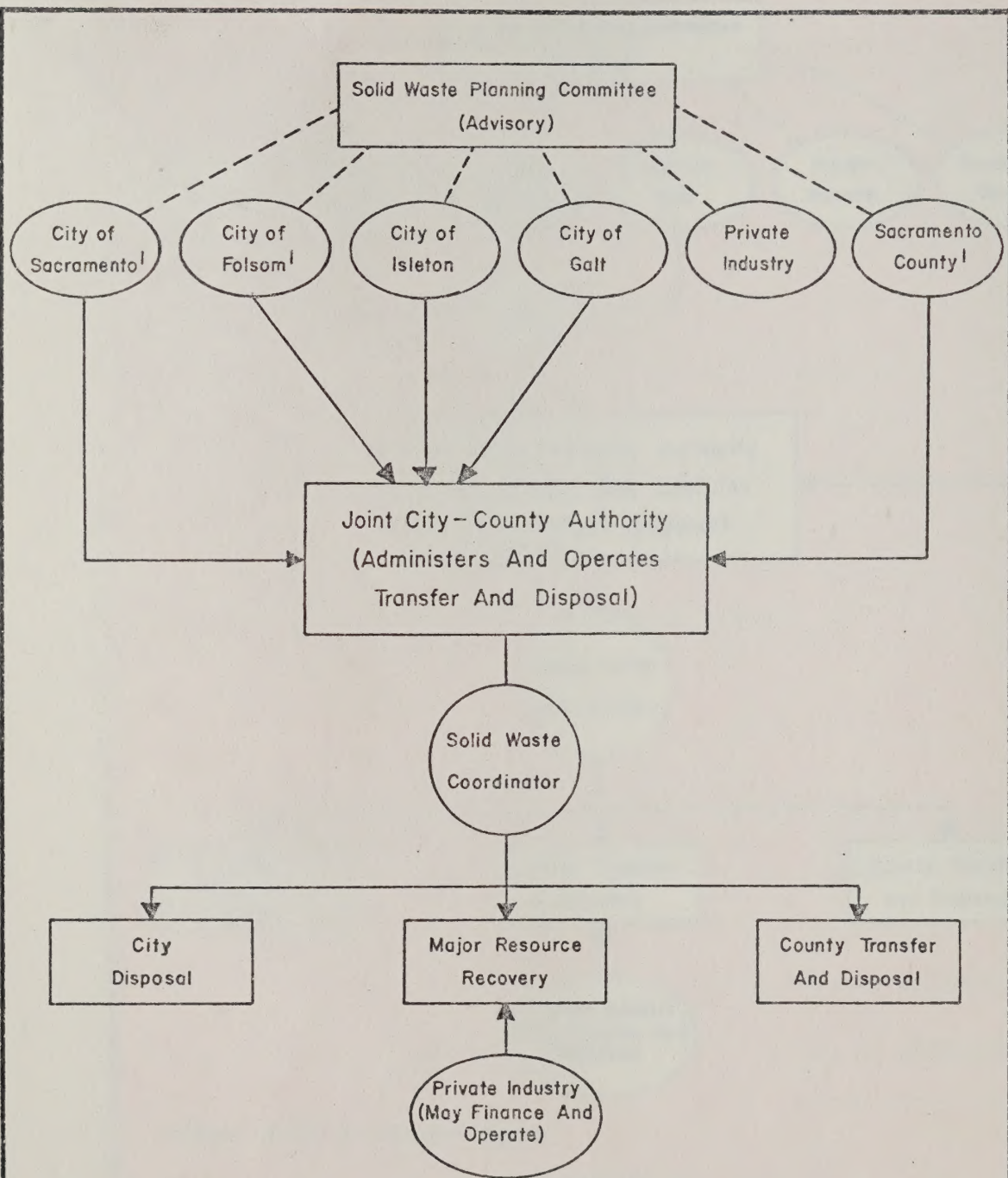
 Proposed

 Processed Refuse or Residue Only

¹. Depends On JPA Decision.

PLATE 2-3 IMPLEMENTATION SCHEDULE

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.



I. Retains Control Of Collection System.

PLATE 2-4
RECOMMENDED ADMINISTRATION
(As changed by Amendment No. I
dated June 18, 1976)

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

Chapter

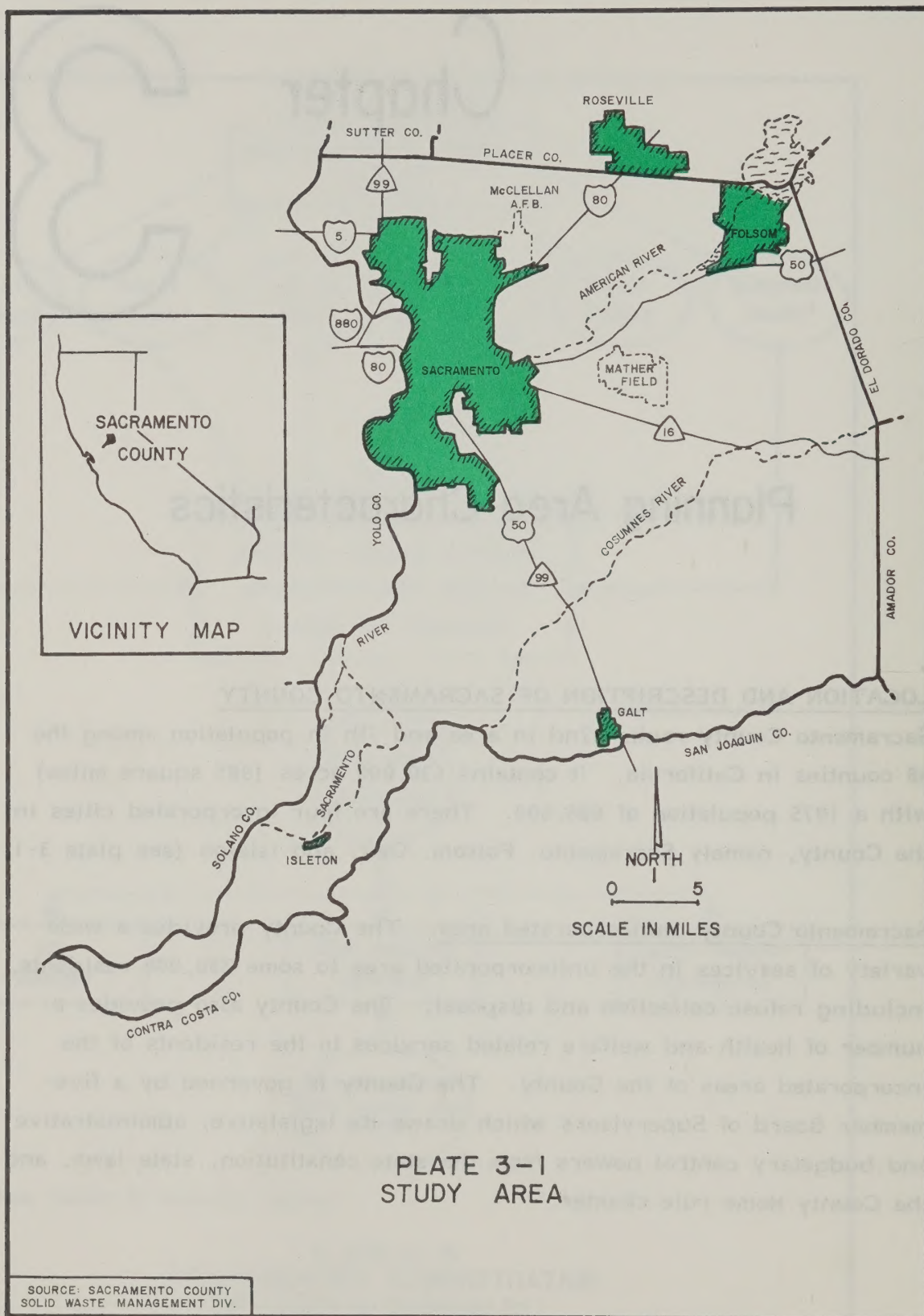
3

Planning Area Characteristics

LOCATION AND DESCRIPTION OF SACRAMENTO COUNTY

Sacramento County ranks 42nd in area and 7th in population among the 58 counties in California. It contains 630,000 acres (985 square miles) with a 1975 population of 686,000. There are four incorporated cities in the County, namely Sacramento, Folsom, Galt, and Isleton (see plate 3-1).

Sacramento County unincorporated area. The County provides a wide variety of services in the unincorporated area to some 390,000 residents, including refuse collection and disposal. The County also provides a number of health and welfare related services to the residents of the incorporated areas of the County. The County is governed by a five-member Board of Supervisors which draws its legislative, administrative and budgetary control powers from the state constitution, state laws, and the County home rule charter.



Sacramento. The City of Sacramento was incorporated in 1850 and operates under a charter giving it home rule privileges. The city occupies approximately 94 square miles of land and has an estimated population of 273,200, approximately 41 percent of the county population. The city provides a full range of municipal services including refuse collection and disposal.

Isleton. Isleton, a general law city, was incorporated in 1923. The city is located on Andrus Island, in the delta, thirty-four miles southwest of Sacramento. It is the smallest city in the County, containing 252 acres and an estimated population of 900. Isleton is governed by a five-member city council. The mayor, a member of the council, is the chief executive officer. The city government provides a limited number of municipal services. Refuse collection and disposal is contracted to private industry.

Galt. The City of Galt, a general law city incorporated in 1946, is located in the south-central sector of Sacramento County. The city comprises 1.8 square miles and has an estimated population of 4,000. Galt is governed by a five-member city council and has a council-manager type of government. It provides a limited range of municipal services. Refuse collection and disposal are contracted to private industry.

Folsom. The City of Folsom is located on the edge of the urban area to the north and east of Sacramento. Folsom comprises 17.5 square miles and has an estimated population of 8,000. The city's economy is closely interdependent with that of Sacramento. Folsom is governed by a five-member city council and has a council-manager form of government. The city provides a limited range of municipal services including solid waste collection. Refuse disposal services are supplied by Sacramento County.

NATURAL PHYSICAL CHARACTERISTICS

Climate. Climate in the Sacramento region is of the mediterranean and

subtropical type, characterized by hot, dry summers and cool, moist winters. Rainfall in Sacramento County varies from 13 annual inches in the delta to 25 annual inches near Folsom Lake. Southerly winds prevail in the County, with an average velocity of 7 to 9 miles per hour.

Geology. Sacramento County is situated in the Sierra Nevada and the Great Valley geomorphic provinces, the greatest portion of the County being in the Great Valley province. The Sierra Nevada province is underlain by hard rock and is characterized by steep sided hills and narrow, rocky stream channels. The highest County elevations are found in this province. The Great Valley province is a large structural basin which has become filled with sedimentary rocks.

Seismic activity. Earthquakes in Sacramento County have been almost non-existent in the historical past. However, special seismic engineering precautions should be taken during construction in the delta, the alluvial flood plains, and the Folsom dredger area of eastern Sacramento County.

Subsidence. Ground settlement has been noted at various locations in the Great Valley. This phenomenon represents a problem in the delta area of Sacramento County where islands have subsided some 10 to 15 feet below sea level since the middle 19th century.

Minerals. Mining is an important component of the County. Natural gas, sand and gravel are major resources in the Sacramento area which have regional economic significance.

Hydrology. The major considerations in this area are surface water, ground water recharge areas, drainage areas, and flooding. Drainage water emanating from the Sacramento County water shed eventually finds its way into one of the following major rivers: Sacramento, American, Cosumnes or Mokelumne. All runoff water leaving the County makes its way to San Francisco Bay via the Sacramento or San Joaquin Rivers. The general pattern of drainage is from the northeast to the southwest.

Historically, flooding has been a perennial problem in the Sacramento area. However, with the construction of the Folsom Dam on the American River and the Oroville Dam on the Feather River (a tributary to the Sacramento River), flooding has been brought under control.

Only a relatively small portion of the land area of Sacramento County is underlain by materials with sufficient infiltration capability to provide natural recharge for the ground water body. It is only along active stream channels that sand and gravel occurs of sufficient areal extent and depth to allow significant quantities of surface water to infiltrate and recharge the ground water body.

CULTURAL CHARACTERISTICS AND POPULATION

Cultural Characteristics. The founding of the City of Sacramento at the confluence of the Sacramento and American Rivers provided the seed for urbanization of the northern portion of Sacramento County. These two rivers were critical to the life of the city. They provided a convenient water supply and good transportation. They also brought disaster from time to time in the form of flooding. However, with the construction of a network of levees, the urban area was free to grow without the constant fear of flood disasters.

Major employment centers, such as McClellan Air Force Base in the north, the aero-space industry and Mather Air Force Base in the east, and the U.S. Army Depot and food processing industries in the south, have been responsible in part for the urban growth within the County.

Although a large area of Sacramento County is urban or urbanizing, the predominant existing land use is non-urban. Non-urban areas of the County are used mostly for a variety of agricultural purposes, ranging from dry-land grazing, to intensive orchards, and row crops. However, some of these areas are used for non-urban recreation, and a few areas might be considered unused and in a relatively natural state.

Population. Plates 3-2 and 3-3 provide general information regarding urban development and population growth.

LAND USE CHARACTERISTICS

Agriculture. Sacramento County's land is used primarily for agricultural purposes. In terms of gross value and volume, the leading farm commodities produced are beef cattle, milk, pears, corn, tomatoes and rice.

Of the County's 630,400 acres, 418,737 acres were used for agricultural production in 1972. This represents 66.4 percent of the County's total land area.

In the ten-year period, from 1962 to 1972, land use in agricultural production increased by 11.7 percent. Land used for intensive agriculture increased by 35.5 percent.

Housing. The main consumer of space in the urban area has been and will continue to be residential use. About 25 percent of the total land area of the County will be urbanized by 1990 and over 96 percent of the projected 1990 population of 880,000 will be residing within this urban area. Plate 3-3 shows the planned urban development area for Sacramento County.

A total of 301,300 household units will be needed by 1990 to house a population of 880,000. This is an increase of 89,100 dwelling units over the 212,200 units existing in 1970. To achieve this total, an average of 4,445 new units must be built each year of the planning period. Table 3-1 shows the housing projection through 1990.

ECONOMIC CHARACTERISTICS

Income producing activities in Sacramento County include manufacturing, agriculture, government work, trade, transportation, and miscellaneous commercial and industrial services. The total average employment as of

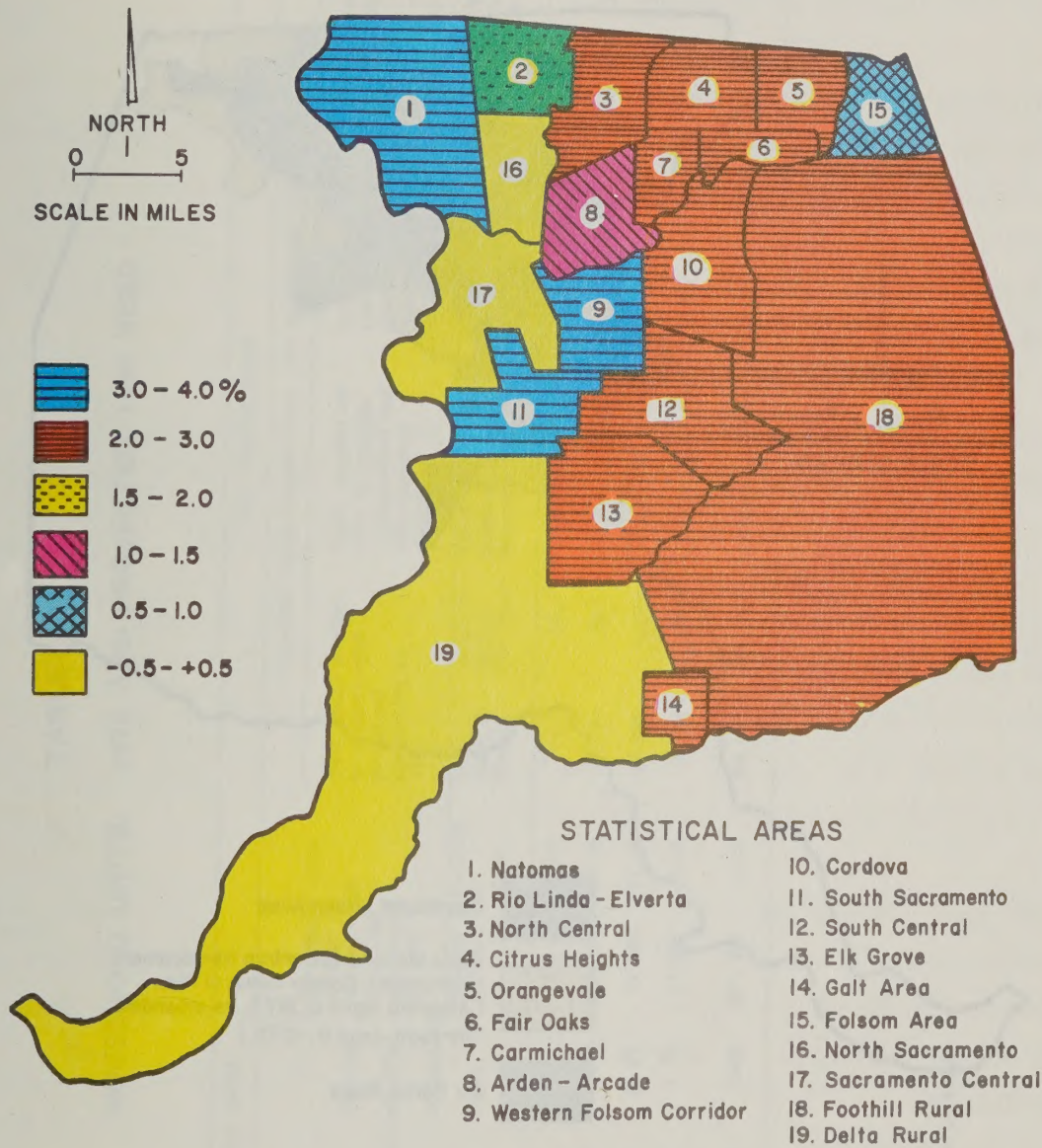


PLATE 3-2
AVERAGE POPULATION GROWTH PER YEAR*
(1960 - 2000)

* Based upon 1960 and 1970 census data and derived from 10-year incremental population projections prepared by the Sacramento County Planning Department in 1972.

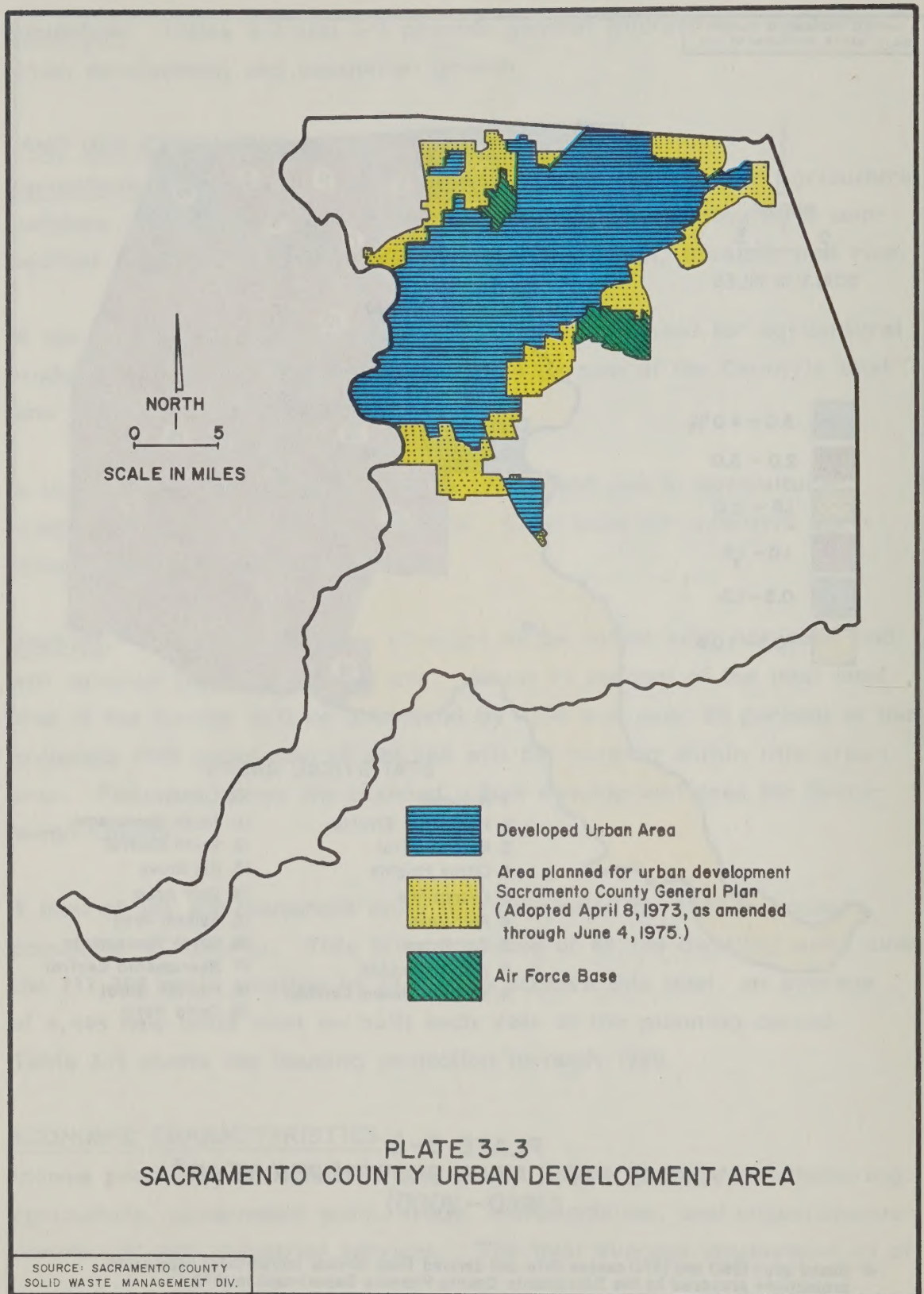


TABLE 3-1

HOUSEHOLD UNITS: 1970 AND PROJECTED 1990 NEED

Type of Household Unit	1970 DATA		1990 PROJECTIONS									
	Total Household Units	Percent of Total Household	Household Units Needed from 1970 to 1990 by Category									
			Household Units needed to accommodate projected population in 1990		New Units needed to accommodate projected population in 1990		Units needed by 1990 to replace substandard and deteriorating dwellings		Units needed to replace dwellings destroyed or demolished between 1970 and 1990		Total Household units needed from 1970 - 1990 (new and replacement units)	
			Number of Units	Percent of Total	Total Number Needed	Average Number Per Year	Total Number Needed	Average Number Per Year	Total Number Needed	Average Number Per Year	Total Number Needed ¹	Average Number Per Year ²
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Single Family	157,800	74.5%	194,300	64.5%	36,500	1,925	25,576	1,279	2,363	118	64,439	3,222
Multiple Family	50,300	23.6%	95,200	31.6%	44,900	2,245	10,157	508	938	47	55,995	2,800
Mobilehome	4,100	1.9%	11,800	3.9%	7,700	7,700	1,067	53	99	5	8,866	443
Total Household	212,200	100%	301,300	100%	89,100	89,100	36,800	1,840	3,400	170	129,300	6,465

¹ Columns 5 + 7 + 9² Columns 6 + 8 + 10

Source: 1973 Housing task force study

1973 was 131,300 persons. At least one-third of the employment force in the county is made up of government employees, including Federal, State, and local governments.

TRANSPORTATION CHARACTERISTICS

Major Streets and Highways. The major street and highway system in Sacramento County consists of a grid network of major streets and a radial system of freeways having their hub in downtown Sacramento. Responsibility for the major street and highway system is divided between state and local governments.

Airports. Sacramento County operates three airports serving the majority of the present civilian air transportation needs of the community. Two U.S. Air Force bases are located in the County.

Deep Water Port. Work began on a deep water shipping canal in 1946 and the present Port of Sacramento opened in 1963. The canal, twenty-four miles in length and with a depth of thirty feet, eliminated fifteen miles from the old Sacramento River route. The Port is situated in Yolo County west of downtown Sacramento.

Railroads. The Sacramento area is served by two major railroads, the Southern Pacific and the Western Pacific, and has direct connections with a third, the Santa Fe Railway. Trains going to all parts of the State and Nation are made up in the marshalling yards at Roseville and Sacramento.

ENVIRONMENTAL CHARACTERISTICS

Air Quality. The geography and weather of the Central Valley limit the dispersal of air pollutants. Thermal and subsidence inversion, mountains, wind, and sun collectively affect the local air pollution profile. The county's ambient air conditions occasionally exceed State and Federal standards.

Water Quality. The American and Cosumnes Rivers enter the County in a relatively clean condition. The Sacramento River can be considered to be of good quality although it carries a considerable agricultural waste-load.

Noise Pollution. Community noise is becoming a serious environmental problem in Sacramento County. Noise levels in urban areas have increased continuously in recent years throughout the United States at an estimated rate of one decibel per year. Given present noise levels and the historical rate of increase, ambient noise could constitute a serious health hazard to many County residents by the year 1990.

SUMMARY OF RELATED SOLID WASTE PLANNING ACTIVITIES - EXCERPTS

1973 SRAPC General Plan. Comprehensive solid waste management planning has been very limited in the Sacramento Region. While existing programs have been adequate for some current conditions, there is a definite need for a comprehensive system which deals with all aspects of solid waste management. Problems which need to be addressed include the illegal dumping of solid waste; the lack of collection services in areas of low population density; inefficiency within existing collection services; air pollution resulting from agricultural burning; waste of valuable, recoverable resources such as various petroleum wastes; and the lack of storage and disposal sites for hazardous wastes.

The Sacramento Regional Area Planning Commission has developed a general waste management goal which seeks a compatible combination of solid waste management and environmental quality. The general goal is as follows:

- o *To develop effective and environmentally sound waste management programs in the region to guide and serve appropriate and planned development.*

Specific goals have been developed for the collection, disposal, recycling, and hazardous waste programs which are the components of solid waste management in the Region. They are:

- o To provide solid waste collection programs capable of handling solid waste generated in the region in an efficient manner conducive to recycling, resource recovery, and elimination of the impetus for illegal dumping.*
- o To provide solid waste disposal programs that consist of sanitary landfill sites, or other methods, which can process and dispose of solid wastes generated in the region in an efficient and economical manner which insures a safe and healthful environment.*
- o To provide recycling and resource recovery programs capable of handling solid wastes generated in the region in a manner that will conserve depleting resources, significantly reduce the quantity of wastes requiring disposal, provide an economic profit, or promote citizen participation and concern for the environment.*
- o To provide hazardous waste programs capable of collection, processing, recycling, and disposing of hazardous wastes generated in the region in an efficient and economical manner which insures a safe and healthful environment.*

The following General Policies were adopted in the SRAPC Plan:

- o Where shown to be advantageous, a multi-jurisdictional or regional approach to the solution of solid waste problems should be adopted.*
- o Public and private recycling programs should be promoted to reduce the amount of solid waste disposed in the environment.*
- o The development and use of environmentally sound sites and processes for waste disposal by local jurisdictions should be considered to minimize odor, noise, vermin, and other nuisance factors associated with waste disposal facilities.*
- o Solid waste management services should be available to all inhabitants of the Region in relation to quantities generated and the environmental condition of the locale.*

1973 Sacramento County General Plan. To meet the refuse disposal needs of Sacramento County during the twenty-year planning period, sanitary landfill disposal activities will be continued and concentrated at one main disposal site, with the possibility of additionally developing a supplementary Class I site for especially hazardous materials. Furthermore, the three current disposal systems, excluding the Isleton facility, may be integrated into an overall operation utilizing the main disposal site and employing several strategically located transfer stations.

Alternative methods of refuse disposal will be considered to handle the needs and problems beyond 1990. As technology improves, new ecologically sound and economically feasible methods of refuse management and disposal will be developed, providing some choices for future action.

In order to provide sound and effective solid waste disposal services, it is the policy of the County of Sacramento:

- o To continue the sanitary landfill operations and develop transfer stations as needed to meet the refuse disposal needs of the County during the twenty year period from 1970 to 1990.
- o To concurrently develop long-range solutions to solid waste management, emphasizing ecological and environmental protection, including such possibilities as recycling, reclamation, compost production, etc.
- o To directly operate or supervise all refuse disposal activities in the unincorporated areas of the county and assure that refuse collection services meet all standards and guidelines adopted by the county.
- o To develop and landscape parks and recreation facilities on appropriate sites where landfills have been completed and to have the other sites properly finished off so as to be suitable for development as provided by the zoning district in which the site is located.

1974 Sacramento City General Plan. The following waste disposal policies are recommended for adoption.

- o Continue present sanitary landfill operations at the 28th and A Streets site.
- o Refine plans to convert the 28th and A Streets site to a recreation facility upon completion of landfill operations.
- o Explore, in conjunction with the County, long-range solid waste management solutions that emphasize ecological and environmental protection.
- o Encourage and support efforts for the establishment of a refuse disposal site for toxic industrial or agricultural waste materials.
- o Develop and implement programs to recycle solid wastes.
- o Assist the County wherever possible in its effort to develop a comprehensive plan for solid waste management.
- o Encourage resource conservation in all solid waste disposal programs.
- o Study, in cooperation with the County, the feasibility of using solid wastes as an energy source (fuel).

1974 RECOMMENDED WATER QUALITY MANAGEMENT PLAN

This plan has been reviewed by local planning staff and the information contained therein has been recognized in the preparation of this solid waste management plan.

1972 STATE IMPLEMENTATION PLAN FOR ACHIEVING AND MAINTAINING THE NATIONAL AMBIENT AIR QUALITY STANDARDS

This plan has been reviewed by local planning staff and the information contained therein has been recognized in the preparation of this solid waste management plan.

1973 SACRAMENTO VALLEY AIR BASIN REVISED CONTROL STRATEGY AND ITS EFFECTS

This plan has been reviewed by local planning staff and the information contained therein has been recognized in the preparation of this solid waste management plan.

Chapter

4

Refuse Quantities & Projections

INTRODUCTION

This chapter discusses the quantities and composition of refuse generated within Sacramento County and forecasts the amount of waste that is likely to be generated in future years. This information is used in sizing future solid waste facilities and in comparing alternative solid waste management programs.

REFUSE QUANTITIES

Four categories of solid waste are generated in the County: municipal, industrial, agricultural and special wastes. Generally, each category has different composition and handling requirements. A detailed definition of each of these waste categories can be found in Appendix A (Glossary of Terms).

Waste Generation Areas. For purposes of analysis, the County was divided into 51 waste generation areas. This division was an essential

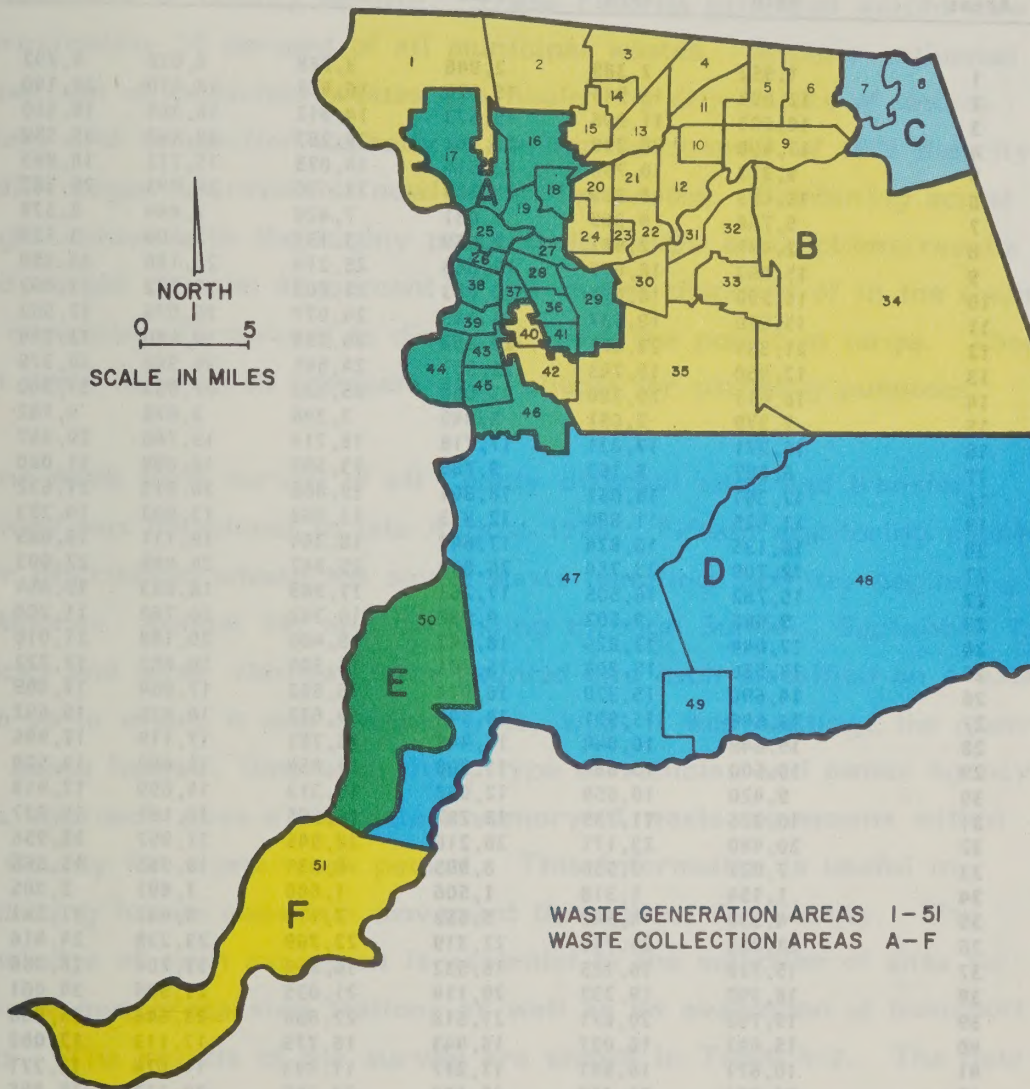
first step in evaluating haul distances and costs for transfer station and disposal site locations. These areas are displayed in plate 4-1 and described in Appendix B. Criteria for selection of these areas were based on the following order of priorities:

- o Political boundary - Each area is to be entirely within the same city or unincorporated area.*
- o Solid waste collection procedures - The solid waste collection disposal services will be provided by the same agencies throughout each area.*
- o Census tract boundaries - Each area boundary is to coincide with census tract boundaries except where they conflict with 1 and 2 above.*
- o Population count - The population of each area is to be approximately 15,000. Population data relative to each of these areas are shown in Table 4-1.*

Waste Collection Areas. The final step in organizing refuse quantity data was the development of waste collection areas for purposes of evaluating waste movement in parts of the County with similar waste services. Six waste collection areas were established along political and refuse collection permit boundaries in the North County and along permit boundaries in the South County. The collection areas are also presented in plate 4-1 and described more completely in Chapter Five.

Measure of Quantities. Solid wastes can be measured by volume, weight, or item count. Volume is generally reported in cubic yards, while weight is usually reported in tons. Wastes such as tires and litter are sometimes reported by item count.

This plan describes refuse quantities by weight. The special waste items measured by volume and item count have been converted to weight by applying unit density factors.



WASTE GENERATION AREAS 1-51
WASTE COLLECTION AREAS A-F

PLATE 4-1
WASTE GENERATION AND COLLECTION AREAS

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

TABLE 4-1
EXISTING AND PROJECTED POPULATION

Waste Generation Areas	Population					
	1970	1975	1980	1985	1990	2000
1	1,952	2,389	2,946	3,268	3,626	4,292
2	12,694	13,945	15,320	16,821	18,470	23,150
3	10,603	11,996	13,573	14,912	16,384	18,460
4	17,458	20,239	23,462	26,287	29,453	35,552
5	9,313	10,796	12,516	14,023	15,712	18,965
6	16,493	18,299	20,303	22,526	24,993	29,582
7	5,768	6,368	7,031	7,426	7,844	8,579
8	2,421	2,681	2,969	3,133	3,306	3,621
9	15,463	18,677	22,560	25,214	28,180	34,350
10	16,290	18,074	20,053	21,603	23,272	24,462
11	15,990	18,537	21,489	24,077	26,976	32,562
12	21,335	23,671	26,263	28,293	30,480	32,038
13	17,450	19,743	22,337	24,541	26,963	30,379
14	18,013	20,380	23,058	25,333	27,833	31,360
15	2,379	2,691	3,045	3,346	3,676	4,142
16	16,371	17,031	17,718	18,714	19,766	20,367
17	6,807	8,163	9,789	13,599	18,899	31,080
18	17,361	18,067	18,801	19,858	20,975	21,612
19	11,425	11,890	12,373	13,068	13,803	14,223
20	16,135	16,874	17,647	18,364	19,111	19,889
21	22,709	23,750	24,838	25,847	26,898	27,993
22	15,782	16,505	17,261	17,963	18,693	19,454
23	9,086	9,502	9,938	10,342	10,762	11,200
24	17,044	17,825	18,642	19,400	20,188	21,010
25	14,538	15,204	15,901	16,384	16,881	17,222
26	14,696	15,370	16,074	16,562	17,064	17,409
27	13,646	13,991	14,344	14,633	14,928	15,692
28	15,649	16,044	16,449	16,781	17,119	17,995
29	10,500	10,887	11,288	11,854	12,449	13,529
30	9,420	10,658	12,058	13,313	14,699	17,918
31	10,376	11,739	13,282	14,665	16,191	19,737
32	20,480	23,171	26,216	28,945	31,957	38,956
33	7,027	7,950	8,995	9,931	10,965	13,366
34	1,154	1,318	1,506	1,688	1,891	2,305
35	4,330	4,947	5,652	7,111	8,947	11,341
36	21,233	21,769	22,319	22,769	23,228	24,416
37	15,728	16,125	16,532	16,866	17,206	18,086
38	18,390	19,232	20,114	21,035	21,999	24,061
39	19,765	20,671	21,618	22,608	23,644	25,860
40	15,642	16,037	16,443	16,775	17,113	17,088
41	10,671	10,941	11,217	11,443	11,674	12,271
42	20,973	21,717	22,488	23,286	24,113	25,855
43	10,184	10,651	11,139	11,649	12,183	13,325
44	16,154	16,894	17,668	18,468	19,342	21,155
45	18,317	19,156	20,034	20,952	21,912	23,966
46	5,277	5,519	5,772	6,036	6,313	6,904
47	12,394	13,352	14,384	16,354	18,593	20,336
48	2,898	3,360	3,895	4,407	4,986	6,077
49	4,370	5,108	5,960	6,853	7,880	9,890
50	2,005	2,046	2,087	2,118	2,150	2,260
51	2,031	2,072	2,113	2,145	2,178	2,289
TOTAL	634,190	684,026	739,480	793,589	853,858	958,531

Source: Staff calculations based on annual growth rates supplied by the Sacramento County Planning Department.

Weighing and Sampling Data. Three of the solid waste handling facilities in Sacramento County have maintained a history of incoming quantities by weight: 1) North Area Transfer Station, 2) SAWDCO Transfer Station, and 3) County landfill. These records provided weight data on approximately 50 percent of all municipal wastes. Another estimated 30 percent of municipal wastes are hauled by city trucks of known volume and compaction capacity. During the summer of 1975 the city landfill began operation of newly installed scales. Combining actual weight values with the highly predictable weight assumptions results in good weight data on 80 percent of the wastes disposed of in the County; the remaining 20 percent is disposed of by the public at large. These data were considered adequate and reliable for planning purposes.

A one-week field survey of all County disposal sites and transfer stations was completed in late August 1974. Fifteen monitoring people were distributed among the seven waste handling facilities beginning on Monday, August 26, and continuing through Sunday, September 1. Trucks and other vehicles were counted and each classified on a data form as to where it was hauling from, what it was hauling, the quantity being hauled, time of arrival, type of vehicle, and owner agency. This approach gave a complete inventory of waste movements within the County for a one-week period. This information is useful in predicting future materials movement throughout the County. The knowledge of such movement is essential to the selection of sites for transfer and processing stations as well as an evaluation of transport costs. The results of the survey are shown in Table 4-2. The data presented include an adjustment to field measured values that accounts for seasonal variations.

The field survey was focused on municipal wastes. Data on the quantity and composition of the remaining waste categories (industrial, agricultural, and special) were developed through other means. Industrial waste data were developed from the results of a questionnaire

TABLE 4-2

LISTING OF COUNTYWIDE WASTE INVENTORY
AUGUST 26 - SEPTEMBER 1, 1974

Tons Per Week

	Residential Collections	Commercial Collections	Street Collections	Construction	Private Citizen	Special Wastes	Totals
Sacramento Company Landfill	2,840	1,560	50	10 ⁽¹⁾ 390	830	250	5,930
Sacramento City Landfill	2,100	---	1,710	230 ⁽²⁾ 360	---	---	4,400
Elk Grove Landfill	80	260	10	140	150	70	710
Grand Island Landfill	10	10	10	10	10	---	40
Waldon's Landfill	---	820	40	200 ⁽¹⁾ 1,560	---	---	2,620
Davis Pit	---	---	10	230	---	---	230
SAWDCO Transfer Station (3)	170	590	---	---	---	---	760
North Area Transfer Station (4)	630	670	30	110	390	---	1,830

Note: All data is rounded to the nearest ten.

1 Dirt rock inerts

2 Street sweepings

3 These figures are reported in disposal site data in the following manner: Waldon's Landfill - 530
Sacramento County Landfill - 230.

4 These figures are reported in the Sacramento County Landfill also.

Source: Staff studies

mailed to 55 industries within the County (data were returned by 36 of those receiving the initial mailing). Agricultural waste data were provided directly by the Farm Advisor from the University of California at Davis, Agricultural Extension Program. Special waste data were derived from numerous sources, both local and nationwide. Typical sources include the County Highways and Bridges Division for data on abandoned automobiles and litter as well as the American Petroleum Institute for nationwide data on waste oil from service stations.

Landfilled and Total Waste Generated. Two sets of data are utilized to delineate current and projected solid waste quantities in Sacramento County: total wastes and landfilled wastes.

"Total waste" is defined as the total quantity of solid waste that is generated in the County (municipal, agricultural, industrial, commercial, etc.). Total waste generation data are necessary in development of solid waste management services and facilities inasmuch as they allow for the prediction of quantities and types of waste that may enter the solid waste stream in the near future when legal, jurisdictional, environmental, economic, and social constraints may prohibit existing practices of disposal.

"Landfilled waste" is defined as that part of the total solid waste generated in the County that enters the solid waste stream and must be stored, collected, transported, and ultimately sent to disposal (residential waste, commercial waste, etc.).

The major distinction between total waste generated and landfilled waste is that agricultural wastes are not included in landfilled waste. While agricultural waste does not enter the solid waste stream to a significant degree as of this date, it does represent approximately one-half of the total generated waste in the County and, therefore, must be addressed.

A detailed analysis of total waste generated is presented in Table 4-3 while landfilled wastes are presented in Table 4-4.

Density and Generation Factors. Since all inventory results were not reported by weight, a series of conversions were necessary. The factors used for converting all waste quantities to weight are shown in Table 4-5. Waste density factors are employed to convert volume measurements and item counts to weight, while the generation factors are employed in the development and projection of waste quantities.

The total quantity of waste generated in the County was derived through the use of the factors described above. (Table 4-3 contains this estimated data for 1975.) Annual tons for each of the six collection areas are presented for each of four waste categories.

Municipal Waste Composition. Municipal waste is a heterogenous mixture of numerous waste components. It is beneficial to know the approximate percent composition of each commonly recognized component, especially for materials recovery. Municipal waste field studies completed in 1972, which included taking samples from collection trucks, were updated through onsite observations in 1974. The results are summarized and presented in Table 4-6. Sacramento County municipal wastes are made up of approximately 75 percent organics and 25 percent inorganics. Identification in these categories is useful since, typically, organics can be readily processed, while it is more difficult to process inorganics.

REFUSE PROJECTIONS

Factors Affecting Refuse Projections. There are three basic factors that affect the estimates of future refuse quantities: (1) increasing per capita generation of wastes, (2) increasing population, and (3) diversion of wastes to reuse through recycling.

TABLE 4-3

TOTAL WASTE GENERATED

1975 Solid Waste Quantities Generated in Each Collection Area¹

Waste Category	A	B	C	D	E	F	Total
Municipal Wastes							
Residential	113,390	137,520	1,310	4,020	300	210	256,750
Commercial	53,390	73,520	1,310	5,530	300	200	134,250
Street	91,390	3,680	1,310	350	320	180	97,230
Private Citizen	20,140	29,380	690	1,660	160	160	52,190
Subtotal	278,310	244,100	4,670	11,560	1,080	750	540,420
Industrial Wastes							
Process Related	10,110	63,780	--	3,890	--	--	77,780
Subtotal	10,110	63,780	0	3,890	0	0	77,780
Agricultural Wastes							
Animal Manure	15,530	301,000	17,340	499,290	67,490	107,240	1,007,890
Row & Field Crop	7,460	144,650	8,330	239,940	32,430	51,540	484,350
Fruit & Nut	210	4,030	230	6,690	900	1,440	13,500
Subtotal	23,200	449,680	25,900	745,920	100,820	160,220	1,505,740
Special Wastes							
Tires & Rubber Products	6,690	9,540	230	550	50	50	17,110
Construction & Demolition	69,895	61,595	50	6,480	30	50	138,100
Hazardous	10	50	--	30	5	5	100
Hospital	2,260	1,640	200	--	--	--	4,100
Dead Animals	230	330	10	20	5	5	600
Litter	2,370	3,370	80	190	20	20	6,050
Abandoned Vehicles	1,005	1,430	35	80	10	10	2,570
Waste Oils	3,575	5,095	120	290	30	30	9,140
Street Sweepings	12,185	12,185	--	--	--	--	24,370
Sewage Sludge	12,210	11,660	--	--	--	--	23,870
Septic Pumpings	830	6,240	420	830	--	--	8,320
Subtotal	111,260	113,135	1,145	8,470	150	170	234,330
TOTAL	422,880	870,695	31,665	769,840	102,050	161,140	2,358,270

¹. See Plate 4-1

Source: Staff studies

TABLE 4-4
LANDFILLED WASTE

1975 Solid Waste Quantities Disposed at Each Landfill

	Sacramento County Landfill	Sacramento City Landfill	Elk Grove Landfill	Grand Island Disposal Site	Waldon's Pit Land- fill	Davis Pit	Total Disposal
Residential	149,570	110,790	4,040	510	---	---	264,910
Commercial	82,760	---	13,430	510	43,340	---	140,040
Private Citizen (Self Haul)	43,810	---	7,990	390	---	---	52,190
Street Collection	2,910	90,870	480	510	2,360	100	97,230
Construction & Demolition	20,890	19,120	7,560	200	82,100	---	129,870
Dirt Rock & Inerts	390	---	---	---	11,010	---	11,400
Street Sweepings	---	12,190	---	---	---	12,180	24,370
Special Wastes	13,390	---	3,900	---	---	---	17,290
TOTAL	313,720	232,970	37,400	2,120	138,810	12,280	737,300

1. Landfilled wastes exceed generated wastes by the amount of wastes imported from other counties.

Source: Staff studies

TABLE 4-5
WASTE CONVERSION FACTORS

		Waste Density (lbs/cu. yd.)	Generation Factors ⁵ (annual)	Future Growth Factors for Waste (annual)
I.	Municipal Waste			
	A. Residential	180 ¹ /560 ²	760 lbs/capita	---
	B. Commercial	170 ¹ /500 ²	390 lbs/capita	---
	C. Private Citizen Waste	550 ¹	150 lbs/capita	---
	D. Grass, Leaves, etc.	300 ¹	285 lbs/capita	---
II.	Industrial Waste			
	Process Related Waste	---	---	2%
III.	Agricultural Waste	---	---	No Growth
IV.	Special Wastes			
	A. Tires & Rubber Products	--- ⁴	50 lbs/capita	---
	B. Construction & Demolition	750 ¹	405 lbs/capita	---
	C. Hazardous Waste	---		2%
	D. Hospital Wastes	---	12 lbs/capita	---
	E. Dead Animals	---		2%
	F. Litter	324 ¹	18 lbs/capita	---
	G. Automobiles (Abandoned)	3,575 lbs/veh. ³	2.1 veh/1000 capita	---
	H. Waste Oil	---	27 lbs/capita	---
	I. Street Sweepings	1800 ¹	75 lbs/capita	---
	J. Sewage Sludges	---	91 lbs/capita	---
	K. Septic Pumpings	---	24 lbs/capita	---

1 - Loose waste

2 - Compacted waste

3 - "The Automobile Cycle, an environmental & resource reclamation problem."
EPA - 1972

4 - Passenger vehicle tires - 25 lbs/tire; other tires (average) - 80 lbs/tire -
"Rubber Reuse and Solid Waste Management," EPA - 1971

5 - Generation factors are assumed to remain constant throughout the planning
period, 1975 to 2000, for each waste category.

Source: Except as otherwise noted all data was developed by staff from available
reports and field observations.

TABLE 4-6
PERCENTAGE COMPOSITION OF MUNICIPAL WASTES

Waste Component	Residential	Collections Commercial	Street	Private Citizens	Const. & Demo.	Street Sweepings
Paper - Misc.	26.4%	35%	5%	20%	12%	2%
Newspaper	9.1%	--	--	5%	--	--
Corrugated	2.8%	18%	--	6%	18%	--
Ferrous Metal	6.4%	12%	1%	10%	2%	1%
Nonferrous Metal	1.3%	3%	--	2%	--	--
Glass	9.8%	7%	1%	4%	1%	1%
Plastic	1.3%	3%	1%	2%	--	1%
Textiles	1.1%	2%	1%	2%	--	--
Wood	0.8%	7%	10%	6%	40%	--
Rubber & Leather	0.9%	8%	--	3%	--	--
Yard Waste	26.5%	--	75%	35%	--	20%
Dirt, Rock & Concrete	--	--	5%	3%	25%	75%
Garbage	13.4%	--	--	--	--	--
Miscellaneous	0.2%	5%	1%	2%	2%	--
TOTAL	100%	100%	100%	100%	100%	100%

Source: Staff estimates derived from two sources; (1) Department of Public Works separation studies conducted in 1972, and (2) City and County staff evaluation in 1974.

Per Capita Generation Rates. Per capita generation rates are used for municipal wastes and most special wastes. The present rates of municipal refuse generation are presented in Table 4-7. The rates vary from 1.04 tons per capita per year (5.70 lbs. per capita per day) in the urban Area A to .036 tons per capita per year (1.97 lbs. per capita per day) in the rural Area F. In estimating future per capita generation rates, it is necessary to consider the fact that continuously increasing standards of living result in increasing quantities of waste being generated by each person. The effect of this trend has decreased in recent times, due to a growing public awareness of the need to cut down on waste quantities (particularly in packaging) and due to a downturn in the national economy. For the purpose of this solid waste management plan, it was considered that the per capita generation rates for municipal wastes would remain constant.

Industrial waste quantities were projected for future years on a total quantity basis. An annual rate of two percent was estimated for growth in total industrial waste.

Agricultural wastes are extremely variable and dependent on crop rotations and weather conditions. Because of this unpredictability, a constant level of waste generation was maintained.

Special wastes are projected on a per capita basis with the exception of hazardous waste and dead animals. The per capita rates used in projections are presented in Table 4-5. Hazardous wastes and dead animals are estimated to increase at two percent per year throughout the planning period.

Combining municipal, industrial, agricultural, and special waste projections yielded the future total waste quantities for the county. These projections are presented in Table 4-8. Total wastes generated are projected to increase by 15 percent by the year 2000 to a level of 2,714,410 tons per year.

TABLE 4-7
MUNICIPAL WASTE PROJECTIONS

Collection Area	Waste Generation Areas Included (1)	Generation Rate tons/capita/year	Waste Generated				
			1975	1980	tons/year 1985	1990	2000
A	16, 17, 18, 19, 25, 26, 27, 28, 29, 36, 37, 38, 39, 41, 43, 44, 45, 46	1.04	278,310	290,320	204,990	321,760	352,720
B	1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 20, 21, 22, 23, 24, 30, 31, 32, 33, 34, 35, 40, 42	0.64	244,100	270,020	293,050	318,430	362,430
C	7, 8	0.51	4,620	5,100	5,390	5,690	6,230
D	47, 48, 49	0.53	11,560	12,840	14,640	16,670	19,240
E	50	0.53	1,080	1,110	1,120	1,140	1,200
F	51	0.36	750	760	770	780	820

1. See Figure 5-2 for boundaries of waste generation areas.

Source: Staff Studies

TABLE 4-8
TOTAL WASTE PROJECTION

Waste Category	Waste Generated Tons/Year			
	1980	1985	1990	2000
Municipal Waste				
Residential Waste	276,210	295,100	316,220	353,350
Commercial Waste	143,650	153,500	164,520	183,860
Street	105,010	112,260	120,350	134,560
Private Citizens Waste	55,280	59,100	63,380	70,870
Subtotal	580,150	619,960	664,470	742,640
Industrial Waste (Process)	85,880	94,810	104,680	127,610
Subtotal	85,880	94,810	104,680	127,610
Agricultural Waste				
Animal Manures	1,007,890	1,007,890	1,007,890	1,007,890
Row Crop Waste	484,350	484,350	484,350	484,350
Fruit Crop Waste	13,500	13,500	13,500	13,500
Subtotal	1,505,740	1,505,740	1,505,740	1,505,740
Special Wastes				
Tires & Rubber Products	18,490	19,840	21,350	23,970
Construction & Demolition	149,740	160,700	172,910	194,100
Hazardous Waste	150	110	115	130
Hospital Waste	4,440	4,760	5,120	5,750
Dead Animals	660	730	810	980
Litter	6,660	7,140	7,680	8,630
Automobiles (abandoned)	2,780	2,980	3,210	3,600
Waste Oils	9,980	10,710	11,530	12,940
Street Sweepings	26,290	28,170	30,260	33,960
Sewage Sludges	27,180	31,830	36,230	42,700
Septic Pumpings	8,990	9,650	10,390	11,660
Subtotal	255,360	276,620	299,605	338,420
TOTAL Wastes	2,427,130	2,497,130	2,574,495	2,714,410

Note: See Table 5-4 to identify the waste categories that are presently generated in each collection area.

Source: Staff Studies

Population Projections. Increasing numbers of people within the study area will mean increasing quantities of wastes. The estimated future population for the study area by refuse generation centers was presented in Table 4-1. To derive the populations for intervening years, straight-line projections can be used. For any given refuse center in any given year, the estimated population times the estimated municipal per capita generation rates yielded the total municipal waste quantities.

Wastes Diverted to Recycling. There is every indication, given the public pressures for recycling and the increasing prices for some recyclable materials, that recycling will increase in the future. This would mean a decrease in the quantity of wastes remaining in the solid waste stream. However, because markets for recycled materials are very unstable, there is no way to estimate with any reasonable degree of reliability the quantity of wastes that will be removed from the waste stream for recycling. Therefore, it was considered prudent to size the solid waste processing and disposal facilities to handle the maximum potential quantity of waste.

Chapter 5

The Existing System

The study and analysis of the existing solid waste management system in Sacramento County is relevant to planning an improved and expanded system for several reasons. First, it provides an understanding of legal authority and responsibility, operations, level of service provided in various areas, and existing problems that must be overcome by a new system. Second, elements of the existing system which are suitable for future periods can be incorporated into planning for the new system. Third, the existing system is the base condition upon which any new system must be progressively implemented without interrupting collection and disposal services.

Data and information regarding the existing system were obtained from numerous sources: governmental agencies, private collectors, discussions with responsible officials, and by means of community solid waste surveys.

A compilation of solid waste management information is presented in this chapter, together with an inventory of the existing system, which includes legislation, agencies, existing solid waste management, administration and control; and systems related to storage, collection, disposal, transfer, recovery, litter, and special wastes (see Plate 5-1).

LEGISLATION--Relating to Solid Wastes

Beginning in 1956, a series of Federal Acts laid down the overall goals, policies, and guidelines for improving the Nation's environment. These acts cover air, land and water pollution control, and overall environmental quality. Most of the states have followed suit and have enacted similar legislation or are in the process of doing so. The state acts are more specifically tuned to the particular environmental problems and conditions existing in each state, and place specific responsibilities for improving environmental quality with local government, including time limits for planning and implementation.

The major Federal and State of California laws, agencies, goals, and guidelines for local government are summarized in this section because these constitute the framework within which local solid waste management planning must be accomplished.

Federal Legislation

Concern over solid waste pollution of land at the Federal level began concurrently with preparation of legislation on water pollution control, culminating in the Federal Water Pollution Control Act of 1956. It was not until 1965, however, that the first major legislation dealing specifically with solid waste was enacted by the congress - the Solid Waste Disposal Act. This act provided for research, development, and demonstration of new technology for solid waste management and for grants to state and local governments for planning, training, demonstration projects, and certain capital investments in improved systems.

PLATE 5-1

OVERVIEW OF WASTE MANAGEMENT SYSTEM

Administration and Control

Sacramento County Solid Waste Management Division
Sacramento County Department of Community Health
Municipalities

Sacramento City

Folsom

Galt

Isleton

Private Sector

Collection

Refuse Collection System

Sacramento City Waste Removal Department (Public)

18 Sacramento City Rubbish Permittees (Private)

Sacramento County Refuse Enterprise (Public)

6 North Area Sacramento County Collectors (Private)

Delta Refuse Service (Private)

Camarillo Sanitary Service (Private)

Independent Disposal (Private)

Folsom City Garbage Department (Public)

Street Collection (curbside) System

Galt City (Private)

Folsom City (Public)

Isleton City (Public)

Sacramento City (Public)

Sacramento County (Public)

Transfer

North Area Transfer Station (Public)

SAWDCO Transfer Station (Private)

Disposal

Sacramento County Landfill (Public)

Grand Island Disposal Site (Private)

Sacramento City Landfill (Public)

14th Avenue Landfill (Private)

Elk Grove Landfill (Private)

Rio Vista Landfill (Private--out of County)

The Resource Recovery Act of 1970 carries forward the basic objectives of the Solid Waste Disposal Act of 1965, adding emphasis to the conservation of natural resources through recovery of reusable material included in the solid waste stream, particularly municipal refuse (residential and commercial).

The National Environmental Policy Act of 1969 and the Environmental Quality Improvement Act of 1970 set forth overall environmental improvement goals and policies of the Federal Government stating in the latter:

" it is the continuing policy of the Federal Government, in cooperation with state and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill social, economic, and other requirements of present and future generations of Americans."

State Legislation

The government of the State of California began to express concern over the quality of the environment during the early 1950's. Smog, recognized to be a problem in the Los Angeles basin, soon became the subject of much investigation. But, it was not until late in that decade that backyard rubbish burners were banned in the basin. During the next decade, a series of statutes covering both air and water pollution control were enacted. However, in a direct parallel to the development of Federal solid waste legislation, California's comprehensive solid waste management legislation was delayed until 1972, long after most states had enacted similar legislation.

The Solid Waste Management and Resource Recovery Act of 1972 was adopted in recognition of the fact that increasing solid waste problems can not be solved by traditional methods. It establishes a comprehensive State planning program for solid waste management that will serve to

prevent further air, land, and water pollution and conserve natural and economic resources. It assigns primary responsibility to local government, with the State as overseer to assure effective and integrated programs.

Local Legislation

The County and the cities in the County have each adopted separate refuse ordinances. They are as follows: Sacramento County Code - Chapter 6.20; Sacramento City Code - Chapter 19; Folsom City Code - Part 6; Isleton City Ordinance - #'s 14-21-58-119-145-175; and Galt City Code - Chapter 15.

MAJOR AGENCIES INVOLVED IN SOLID WASTE

Federal Agencies

- o *U.S. Environmental Protection Agency: Primarily involved with solid waste management through its Office of Solid Waste Management Programs. This office administers Federal research, training, statewide planning and demonstration grant funds; coordinates research efforts through contracts; and provides technical assistance and consultation to states and other agencies.*
- o *U.S. Army Corps of Engineers: May lease or sell surplus Federal land to the public agencies for use as refuse disposal sites. That agency requires that recipients adhere to EPA guidelines for solid waste management.*

State Agencies

- o *State Solid Waste Management Board: Major responsibilities are to prepare guidelines, set standards, and administer state functions to assure the orderly preparation of county solid waste management plans.*
- o *State Department of Health: Responsibility for protection of the public health from vector-borne diseases and nuisances and its responsibilities include the development and review of minimum standards for solid waste handling and disposal of hazardous wastes.*
- o *State Air Resources Board: Develops statewide policy for control or prevention of air pollution including that from burning of solid waste.*

- o Water Resources Control Board: Develops statewide policy to protect the quality of waters of the State. This board has financially-supported research related to pollution of ground waters by solid waste disposal.
- o Regional Water Quality Control Boards: Responsible for defining reasonable and beneficial use of the waters of the State, and the regulation of waste discharge to protect water quality. These regulatory agencies consider solid waste disposal sites and any leachates therefrom to be a form of waste discharge which may affect water quality. All boards have adopted a disposal site classification system.
- o Division of Highways: Conducts roadside litter control programs and collects refuse from State highways.
- o Department of Motor Vehicles: Establishes requirements for the legal disposal of abandoned or wrecked vehicles and the control of litter from refuse collection vehicles.
- o Department of Water Resources: Provides technical service to State agencies such as the Regional Water Quality Control Boards regarding water quality aspects of solid waste disposal. They are also under contract to conduct studies of solid waste disposal as it affects water.

County Agencies

- o Sacramento County Department of Community Health: Performs ordinance enforcement and litter control activities through its Environmental Health Programs.
- o The Sacramento County Air Pollution Control District, organizationally attached to the Department of Community Health, sets standards related to the burning of solid waste within the County.
- o The Solid Waste and Land Use Management team of the County Environmental Health Programs is responsible for writing and enforcing health related rules and regulations pursuant to the County Solid Waste Management Ordinance. Additionally, this team plays a key role in solid waste enforcement activities in all of the cities within the County.
- o Sacramento County Public Works Department, Solid Waste Management Division: Operates residential collection in the north unincorporated part of the County. It operates the major county landfill site and the North Area Transfer Station. Additionally, it makes recommendations to the Board of Supervisors involving solid waste management matters. Additionally, this department writes and enforces rules and regulations related to refuse operations pursuant to the County Solid Waste Management Ordinance.

- o *Planning Commission: Reviews all solid waste land use proposals and is required by law to decide if such proposals should be granted a use permit.*
- o *Sacramento County Sheriff's Department: Empowered by local ordinance to maintain records on the personal, financial, and organizational involvements of permitted refuse collectors.*
- o *Sacramento County Community Development and Environmental Protection Agency: Provides for the orderly development and review of environmental impact statements on projects and plans; reviews and evaluates all disposal and transfer proposals for compatibility with the general plan.*

Municipal Agencies

Folsom, Sacramento, and Galt have their own ordinances which are enforced by the Department of Community Health in combination with various other municipal officials. Each of the cities in the County provides for collection and disposal as follows: Folsom City provides their own collection and uses the County landfill for disposal; Sacramento City provides their own residential collection and permits commercial collection by private industry. Disposal of Sacramento City collected refuse is at the city landfill. Commercial refuse is disposed at a variety of sites. Galt and Isleton collection and disposal are provided by private industry. A number of city agencies (e.g., planning departments, city engineer, etc.) play key roles in the solid waste decision making process. Their functions are similar to activities described under Local Agencies.

CONTROL AND OPERATION OF EXISTING SYSTEM

County Administration and Control. Organization and administration of the solid waste management system within the unincorporated area of Sacramento County is divided between the Department of Public Works Solid Waste Management Division and the Department of Community Health Environmental Health Programs. The County Solid Waste Management Division is responsible for operation of the County Refuse Enterprise and program and project development related to County disposal sites, transfer stations and other solid waste activities, and ordinance enforcement.

The County Environmental Health Programs enforce health related rules and regulations and ordinances; administers activities related to requests for exemption from mandatory refuse service; provides litter control activities; and provides local input to the enforcement of hazardous and infectious waste requirements. See plate 5-2 for political and legal control of the system.

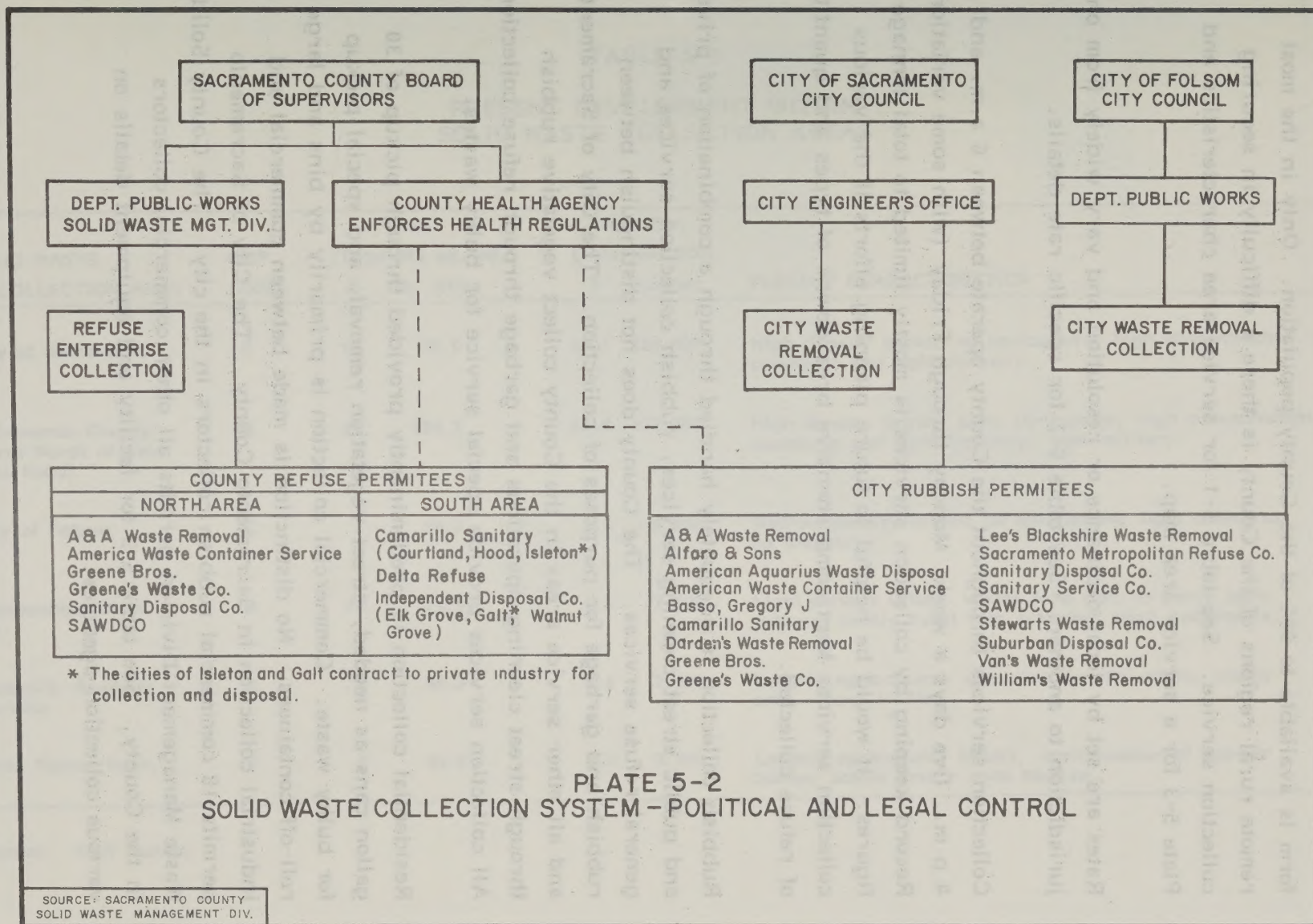
Permits. Some storage of solid waste in Sacramento County is under permit by the County Department of Community Health, such as the storage of infectious wastes at hospitals. All North Area commercial refuse collectors and the three South Area refuse collectors are permitted by the Department of Public Works. All 18 Sacramento City rubbish collectors are permitted by the City Engineer. Sacramento County, Sacramento City, and Folsom City Public Collection Agencies are not under permit but are regulated to some degree by local ordinance. The North Area Transfer Station and the downtown SAWDCO transfer station are not under permit. They are indirectly regulated by local ordinances, but the ordinances do not specifically refer to transfer station activity. Publicly owned and operated disposal sites are not under permit but are regulated by local ordinances. Privately owned and/or operated disposal sites are under permit by the County Department of Public Works.

STORAGE OF WASTES

Sacramento County and several of its municipalities require that garbage stored on any premises shall be kept in watertight containers with tight fitting lids. Ordinances specify size, type, volume, and filled-weight of containers. Standards range from a minimum capacity of 10 gallons to a maximum capacity of 30 gallons, with a maximum weight limitation of 60 pounds "so that the contents can be handled by one man."

COLLECTION OF WASTES

A combination of private and public waste collectors currently provide collection services to Sacramento County. Collection service of some



form is available to 99% of the County population. Only in the most remote rural regions of the County is there a difficulty in securing collection service. See table 5-1 for service area characteristics and Plate 5-3 for a service area map.

Rates are set by local ordinance or resolution and vary widely from one jurisdiction to another. See table 5-2 for specific rate details.

Collection services throughout the County operate between 6 a.m. and 4 p.m., five days a week, Monday through Friday (with some variation). Record keeping by collection services is mostly limited to total tonnage figures. It would be helpful to future planning efforts if the various collection services kept comprehensive breakdowns of types and quantities of refuse collected.

Rubbish collection is adequately handled through a combination of private and public street cleaning services, rubbish collection services and general refuse services. The County does not distinguish between rubbish and garbage for purposes of collection. The City of Sacramento and all other service areas in the County collect vegetative rubbish through street cleaning operations and garbage through refuse collection. All collection services provide special service for bulky wastes.

Residential collection is predominantly provided through pickup of 30 gallon cans as needed, street vegetation removal, and special pickup for bulky waste. Commercial collection is primarily by bins and large roll-off containers. No distinction is made between commercial and industrial collection in Sacramento County. The City of Sacramento permits 18 commercial rubbish collectors in the city. The County Solid Waste Management Division permits all other commercial collectors in the County. See table 5-3 for facility and equipment details on various collection agencies.

TABLE 5-1
PRESENT DEVELOPMENT WITHIN
SOLID WASTE COLLECTION AREAS

SOLID WASTE COLLECTION AREA	MAP CODE	Area (Total=985 sq. mi.)		Population (Total=685,000)		PRESENT CHARACTERISTICS
		%	Sq. Miles	%	Number	
City of Sacramento	A	10	98.5	39.1	268,000	High density urban; no agriculture; high concentration commerce and light industry.
Sacramento County (Area North of Cal- vine Road)	B	38	374.3	55.8	382,000	High density urban; some agriculture; high concentration commerce and light industry; some military.
City of Folsom	C	2	19.7	1.3	9,000	Medium density urban; no agriculture; light commerce; no industry.
Independent Disp. Co.	D	38	374.3	3.2	22,000	Light density urban; varies from light to heavy agri- culture; mostly rural with scattered small settlements.
Camarillo Sanitary Service	E	5	49.2	0.3	2,000	Largely agricultural; some low density urban; scenic area - some tourism.
Delta Refuse Serv.	F	7	69.0	0.3	2,000	Largely agricultural (fruit); small number of summer homes; scenic area - some tourism.

Source: Staff Studies

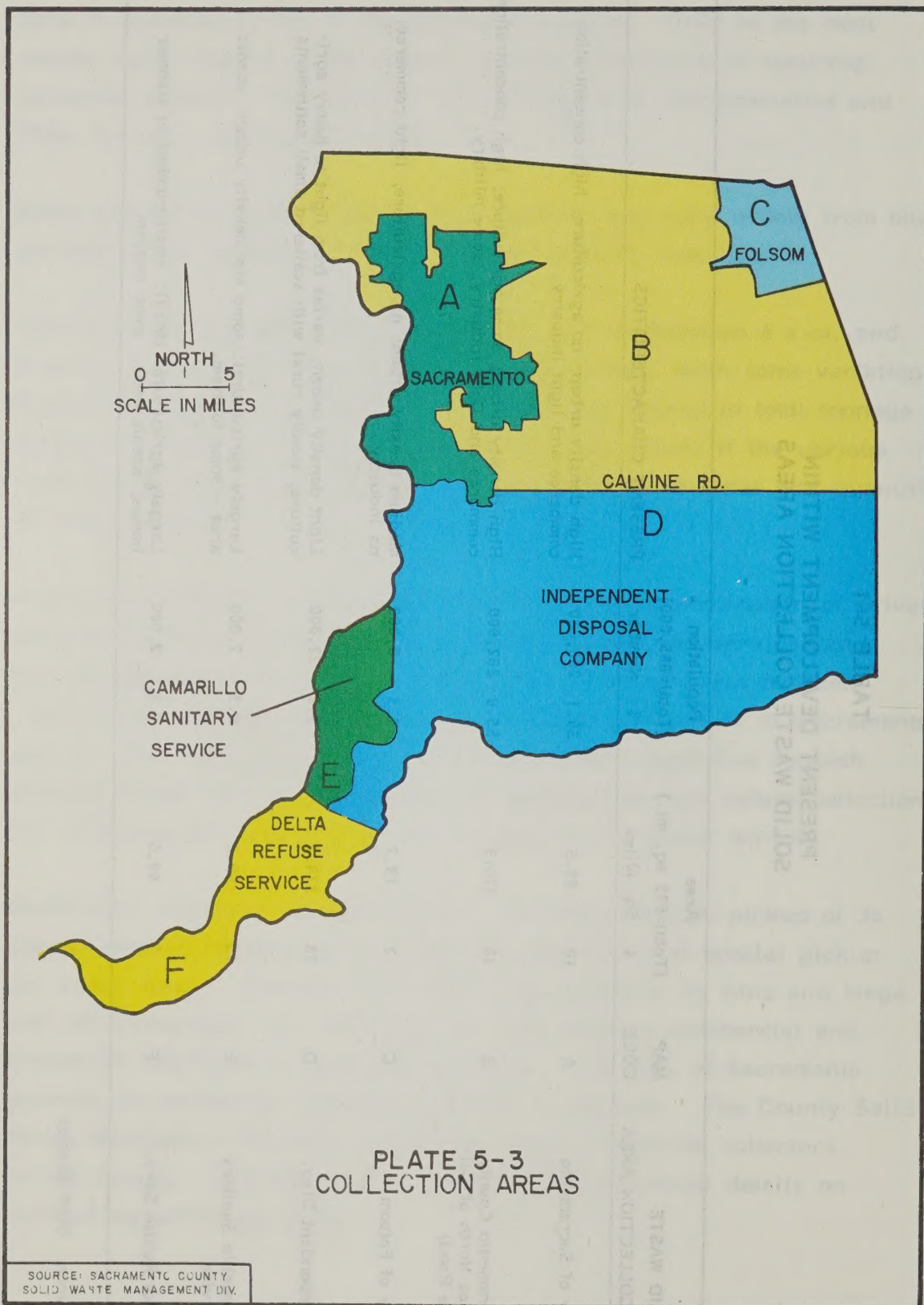


TABLE 5-2
RATE COMPARISON BY COLLECTION AREA

Map Code	Collector	Residential	Commercial
A	City of Sacramento Waste Removal Service (Public)	\$ 2.30/month - 1 30 gal. can/wk. \$ 3.40/month - 2 can/wk. Rates vary with number of cans per week and number of pickups per week.	1 cu. yd. Bin \$ 17.00/mo. - 1/week 27.00/mo. - 2/week 2.00/mo. - 6/week 27.00/mo. compacted 1/week Rates vary with volume, number pickups/week and compaction.
	20 Sacramento City Rubbish Permittees (Private)	NONE	Rates vary with size of account, haul distance, type of waste, and competitive pressures. Precise data unavailable.
	Sacramento County Refuse Enterprise (Public)	\$ 3.75/month - Duplex 4.00/month - Single Family Includes 2 - 30 gallon cans and unlimited curbside pickup once per week.	\$ 2.25/month 1 can 1 pickup/week .75/month for each additional can. Two collections per week - above rates multiplied by two plus \$0.20 per month additional per can.
B		\$ 2.25/month exemption 1 - 30 gal/ can/week - no curbside pickup.	No Bin Service Available
	5 North Area Permittees (Private)	NONE	Rates vary with size of account, haul distance, type of waste, and competitive pressures. Precise data unavailable.
C	City of Folsom Waste Removal Serv. (Public)	\$ 3.50/month 1 - 30 gal. can/week 4.75/month 2 - 30 gal. can/week Rates vary with capacity and number of cans per week.	\$ 3.15 - \$ 4.44 per cubic yard No Bins Rates vary depending on volume of waste and and number pickups per week.
	Independent Disposal (Private)	\$ 2.75/month 1 can/week (30 gal.) 3.25/month 2 can/week	\$ 3.50/month 1 can/week (30 gal.) 1.50/month each additional can 32.00/month 20 cu. yd. drop box 1 pickup per week
	Unincorporated Area of County	1.50/month each additional can	
D	City of Galt	\$ 2.75/month 1 can/week (30 gal.) 3.25/month 1 can/week with curbside pickup 1.00/month each additional can	\$ 2.50/month 1 can/week (30 gal.) 2.25 month
	Elk Grove Sanitary District	\$ 2.60/month 1 can/week (30 gal.) 2.85/month 2 can/week 0.50/month each additional can. Other rates set by collector.	Rates set by collector - See above for Independent
E	Camarillo Sanitary Service (Private)	\$ 4.00/month 1 can/week (30 gal.) 4.75/month 1 can - 2 times/week	\$36.50/month - 2 cu. yd. drop box 1 pickup/week Rates vary with number of pickups per week.
F	Delta Refuse Service (Private)	\$ 2.50/month 2 cans/week (30 gal.)	\$14.00 - \$20.00/month - 3 cu. yd. bins Rate varies with number of bins picked up per week.

Note: Rates shown are for June 1975

Source: Staff Studies

TABLE 5-3A
COLLECTION AGENCIES - INVENTORY BY COLLECTION AREA

JANUARY 6, 1975

MAP CODE AREA	COLLECTOR	NO. EMPLOYED	DAYS & HOURS OF COLLEC- TION	EQUIPMENT INVENTORY		NO. AND TYPE OF ACCOUNTS	NO. ROUTES (CREW SIZE) PER WORK DAY	TOTAL ROUTE MILEAGE PER WORK DAY	AVE. MILEAGE ROUND TRIP TO DISPOSAL
				NO. TRUCKS, SIZE, AND TYPE	NO. BINS OR BOXES AND SIZE				
A	CITY OF SACRAMENTO WASTE REMOVAL SERVICE (PUBLIC)	162 Full Time 5 Part Time	6 days M-S 6 am - 5 pm	69 - 16 cy RL Compactor with bin attachment 1 - Dump Truck	2200 - bins (182 cy) (200 private owned)	82,000 Residential & Commercial	50 Residential 2 Commercial (3 - man crew)	1000 miles	9 miles
	17 SACRAMENTO CITY RUBBISH PERMITEES (PRIVATE) Data shown for 12 Permit- tees hauling in City only. (Under Area "A & B" 5 North Area Permittees also servicing City)	18 Full Time 3 Part Time	⑤ 5 days ② 6 days ① 7 days ④ Part Time (Hours Vary)	2 - 18 & 30 cy FL w/bin attach. 2 - 20 cy RL w/bin attach. 1 - 12 cy SL 5 - Roll-offs 8 - 1 1/2 to 2 ton Flatbed or Dump Truck 1 - Flatbed Chem. Hauler	252 - bins Ave. 3 cy. 52 - bins for salvage 98 - Drop Boxes (20 - 30 cy.) Ave. 25 cy.	470 - Bins 50 Bins Salv. 96 - Dropbox 66 - Trucks	Routes Vary (1 - man crew) Roll-offs & Dump Trucks (2 - man crew) on Packer Trucks	Varies 50 - 75 miles average (est.) up to 300 miles for roll-off hauler.	30 miles
B	SACRAMENTO COUNTY REFUSE ENTERPRISE (PUBLIC)	208 Full Time 14 Part Time	5 days M-F 6 am - 1:30 pm	77 - 20 & 25 cy RL 2 - 13 cy RL 10 - Spare RL 1 - 1.5 ton Stakebed	NONE	89,000 Resid. 2,000 Apts. & Mobilehomes 1,500 Comerc.	72 Residential 8 Commercial 3 Special (2 - man crew)	3000 miles	23 miles 10 miles
A & B	5 NORTH AREA PERMITEES (PRIVATE) Permittees operate in City and County. Data includes activities in both areas.	109 Full Time 2 Part Time	④ 5 days ① 6 days (Hours Vary)	2 - 18 cy SL 7 - 16 & 20 cy RL w/bin att. 13 - 18 & 20 cy FL w/bin att. 5 - 42 cy FL 16 - Roll-offs 4 - 18 cy GMC Pack-More 1 - Combination 1 - 2 ton Dump	450 - bins Ave. 2 cy 6400 - bins Ave. 3 cy 1325 - drop boxes (20 - 40 cy) Ave. 25 cy 100 - Compactor Box. (3 - 4 cy)	4150 - City 4710 - County	27 Packer (2 - man crew) 16 - Roll-off (1 - man crew)	N.A.	8 - 10 miles up to 23 miles for roll-offs
C	CITY OF FOLSOM WASTE REMOVAL SERVICE (PUBLIC)	4 Full Time	5 days M-F 6:30 am - 3 pm	3 - 16 & 20 cy RL	NONE	2,800 Residential & Commercial	5 Routes (2 - man crew)	80 miles	26 miles
D	INDEPENDENT DISPOSAL (PRIVATE)	10 Full Time	6 days M-S 5 am - 2 pm	3 - 16 & 20 cy RL 1 - Roll-off	55 Drop Boxes 20 cy	1000 GALT 1700 ELK GRO 1425 COUNTY	3 - Packer (2 - man crew) 1 - Drop Box (1 - man crew)	5 miles in ELK GROVE up to 100 miles in County	5 miles
E	CAMARILLO SANITARY SERVICE (PRIVATE)	2 Full Time 1 Caretaker	4 days	2 - 20 cy RL 1 - Roll-off	2 Boxes 25 cy	350 Residential & Commercial	1 - Packer (2 - man crew)	80 miles	25 miles
F	DELTA REFUSE SERVICE (PRIVATE)	4 Part Time	2 days M & Th 1/2 day F	2 - 16 & 20 cy RL with bin attachment	40 - Bins Ave. 3 cy	200 Residential 50 Commercial	1 (2 Days) 1 (1/2 Days) (2 - man crew)	120 - 160 miles	25 miles

TABLE 5-3B
COLLECTION AGENCIES - INVENTORY BY COLLECTION AREA

JANUARY 6, 1975

MAP CODE AREA	COLLECTOR	NO. LOADS TO DISPOSAL PER WORK DAY	QUANTITIES PERCENTAGE CITY & COUNTY	REFUSE COLLECTED AVE. DAILY TONNAGE	QUANTITY & TYPE MATERIAL SALVAGED	COUNTY LANDFILL	ANNUAL CITY LANDFILL	COLLECTION ELK GROVE LANDFILL	TONNAGE WALDONS LANDFILL	GRAND ISLAND DUMP	COUNTY TRANSFER STATION	SAWDCO TRANSFER STATION
A	CITY OF SACRAMENTO WASTE REMOVAL SERVICE (PUBLIC)	104 landfill	100% CITY	350 tons	NONE	NONE	109,000 tons	NONE	NONE	NONE	NONE	NONE
	17 SACRAMENTO CITY RUBBISH PERMITEES (PRIVATE) Data shown for 12 Permit- tees hauling in City only. (Under Area "A & B" 5 North Area Permittees also servicing City)	Varys from 1-2 trips per week up to 6 trips per day for roll-offs.	100 %	40-50 tons	4-8 ton/day Paper	7,550 tons	NONE	NONE	4,950 tons	NONE	NONE	NONE
B	SACRAMENTO COUNTY REFUSE ENTERPRISE (PUBLIC)	64 landfill 11 transfer	100% COUNTY	500 tons	NONE	106,000 tons	NONE	NONE	NONE	NONE	24,000 tons	NONE
A & B	5 NORTH AREA PERMITEES (PRIVATE) Permittees operate in City and County. Data includes activities in both areas.	41 packers 32 roll-offs	50 % CITY 50 % COUNTY	605 tons	8 ton/day Newsprint 35 ton/day Cardboard	39,920 tons	NONE	NONE	51,470 tons	NONE	33,250 tons	37,900 tons
C	CITY OF FOLSOM WASTE REMOVAL SERVICE (PUBLIC)	5 landfill	100% CITY	14 tons	NONE	2,800 tons	NONE	NONE	NONE	NONE	NONE	NONE
D	INDEPENDENT DISPOSAL (PRIVATE)	4 landfill	25% GALT 40% ELK GROVE 35% COUNTY	40-45 tons	NONE	NONE	NONE	13,500 tons	NONE	NONE	NONE	NONE
E	CAMARILLO SANITARY SERVICE (PRIVATE)	1 landfill	100% COUNTY	3-4 tons	NONE	NONE	NONE	NONE	NONE	700 tons	NONE	NONE
F	DELTA REFUSE SERVICE (PRIVATE)	1 landfill	50% ISLETON 50% COUNTY	1-2 tons	NONE	NONE	NONE	NONE	NONE	400 tons	NONE	NONE

Sacramento City Collection. Once a week collection is provided for one standard 30 gallon container at the side of the residence. Additional pickups or extra cans can be scheduled for additional fees. Trees and grass trimmings are picked up separately by the city street cleaning department. Other refuse must be hauled by the citizen or private commercial collectors to the county landfill. The city landfill is closed to private collectors and the public.

The service area is divided into 50 residential and two commercial routes. Each route is serviced by one 16-cubic yard rear-loading compactor vehicle with a bin lift attachment. Commercial service is provided by one and two cubic yard bins.

A typical residential crew is comprised of one man designated as driver and one or two men as refuse collectors. Forty-two routes have three-man crews and seven have two-man crews. An additional route manned by a driver only is used for special collections or in answer to complaints of missed collection. Two commercial routes, each comprised of truck and driver, operate in the downtown area for the collection of paper from banks, offices, and government buildings. Collection on each route day is comprised of accounts requiring either single or multiple can pick-ups one or more times per week. In each route area there are accounts with bin containers, burlap blanket containers, and standard garbage cans.

Except for the two commercial paper routes, the waste removal routes collect domestic and commercial garbage. Yard and garden debris is picked up at curbside by the city street department.

All crews operate on an incentive system, wherein at the completion of their designated collection responsibilities they return to the landfill, unload the collected material, park their trucks in the yard area and then leave for the day. The routes are structured such that two trips

are made each day to the city landfill. Lunch break is usually taken between the first and second trips.

Sacramento City Rubbish Permittees. The City of Sacramento permits rubbish collectors to operate within the city limits. There are 20 permits available (1 for 12,500 population) and eighteen are active. These collectors service rubbish accounts and are not allowed to collect garbage. Equipment utilized are front and rear-loading compactor trucks with bin attachments, roll-off trucks with drop boxes, and 1½ to 2-ton flatbed or dump-trucks. The collectors represent essentially one-man/one-truck operations with a few exceptions. These collectors augment the city refuse collection system by providing large bin and packer truck rubbish service. The rubbish collectors in the city provide a necessary service which is considered adequate in quantity and quality.

Sacramento County Collection. Residential solid waste material in the unincorporated area of Sacramento County north of Calvine Road is collected by the Sacramento County Refuse Enterprise. The Enterprise services some 75 routes and 92,500 accounts. The composition of these accounts is predominately residential. The only commercial accounts are those utilizing standard garbage cans for their waste material.

The two-man crews use 65-gallon aluminum carry-cans to collect the waste material from backyard locations. All material is containerized in standard garbage cans, boxes, plastic bags, or other suitable containers. All material in excess of two standard garbage cans must be placed at curbside by the resident. Two standard cans are allowed at side or rear yard locations not to exceed a distance of 125 feet from the street.

Eleven routes dump wastes at the North Area Transfer Station. All but one of these routes utilize twenty cubic yard rear-loading compactor

vehicles with two-man crews. The one exception utilizes a one-man, thirteen cubic yard side-loading compactor vehicle. The smaller truck is required to traverse the narrow, privately maintained roads that are prevalent throughout the North Area.

The routes dumping at the transfer station make two trips per day, Tuesday through Friday. Monday routes require one trip per day to the transfer station.

Sixty-four routes dispose of their waste materials at the County landfill site located at Kiefer Boulevard and Grant Line Road. All trucks on these routes, with the exception of a one-man thirteen yard compactor, are twenty-five cubic yard rear-loading compactors. The longer haul to disposal allows only one trip per vehicle per day. Other than the number of trips per day, the collection routines and methods are identical with those routes dumping at the North Area Transfer Station.

All crews operate on an incentive system. After all materials have been collected from assigned routes, disposed of at either the North Area Transfer Station or County landfill site, and vehicles have been returned to their respective dispatch areas the crews are allowed to leave work.

North Area Permittees. The area north of Calvine Road is commonly referred to as the North Area when identifying collection areas within Sacramento County. The County Refuse Enterprise, which provides residential service to this area, is not equipped to provide bin service, thus the County has elected to open up commercial refuse collection to private industry. The commercial waste collection provided by six permitted collectors in the North Area is deemed adequate as attested to by the small number of complaints regarding quantity and quality of service.

All commercial accounts in the North Area not serviced by the City of Sacramento, County of Sacramento or City of Folsom, are serviced by the following County permitted collectors:

A & A Waste Removal Company. This company collects corrugated cardboard and rubbish from 60 accounts located in the City of Sacramento and in the County North Area. Two 18 cubic yard, side-loading compactor vehicles are used, operating Monday through Friday. The corrugated cardboard is sold to SAWDCO with rubbish being disposed of at the SAWDCO transfer station.

American Waste Container Service. This company provides a wide range of commercial waste services which include standard commercial refuse service, hazardous waste service and liquid waste service. It also owns and operates a liquid waste transfer station which is in developmental stages but portends to become a countywide waste handling facility.

American currently has four drop-box off-loaders, several liquid tankers, and a series of liquid waste storage tanks. The company recycles paper, metals, liquids and plastics.

Greene Brother's Waste Company. Greene Brother's Waste Company collects waste paper and corrugated cardboard from shopping centers, office supply establishments, warehouses, and state and municipal offices. One 20-cubic yard rear-end loader and one two-ton truck operated by the owner/manager service some fifty accounts (city and County). The operating schedule is Monday through Friday. The company collects five to seven tons per week of office waste which is disposed of at either the County landfill, Waldon's Pit, or the SAWDCO transfer station. It also collects 15 to 20 tons of cardboard and high grade paper which is sold to the Sacramento Waste Disposal Company's paper salvaging operation.

Greene's Waste Removal Company. Greene's Waste Removal Company collects an equal amount of corrugated cardboard and rubbish (some 50 tons each per week) from 300 accounts in the City of Sacramento and 300 accounts in the County. Equipment used to collect this material consists of ten 16-cubic yard rear-loading compactor vehicles, six of which have bin lift attachments. The company also owns 450 bins with capacities ranging from one to five cubic yards. The corrugated cardboard is sold to SAWDCO with rubbish and other materials mainly disposed of at the SAWDCO transfer station. Material is also disposed of at the County landfill, the County's North Area Transfer Station, and the Fourteenth Avenue disposal site.

Sacramento Waste Disposal Company (SAWDCO). SAWDCO provides a wide range of service to over 6,000 commercial accounts (city and County). The scope of service ranges from bins (5,000 varying in capacity from one to eight cubic yards) to drop boxes (1,200 varying in capacity from three to 40 cubic yards).

The equipment used to collect the waste material from these containers consists of 13 front-loading, bin-attachment compactor vehicles with capacities of 18 to 23 cubic yards and 13 prime movers to handle the drop boxes and compactor boxes. The bulk of the materials that are not salvaged are sent through SAWDCO's transfer station with ultimate disposal at the County landfill. A small portion (some 20%) of the collected material is disposed of at the North Area Transfer Station.

Sanitary Disposal Company. Sanitary provides a bin and drop-box service to its 950 city and County commercial accounts. Sanitary Disposal utilizes five front-loading compactor vehicles, each with a capacity of 42 cubic yards to serve some 1,400 company-owned bins having capacities of three, four, and six cubic yards. There are also 125 drop boxes having capacities of 15, 20, 30, and 40 cubic yards, picked up and deposited by three prime movers.

Ninety-five percent of the collected material is transported to the County disposal site. The remainder is disposed of at the 14th Avenue disposal site.

South Area Permittees. The area south of Calvine Road, usually referred to as the South Area, is serviced by three collection services, each permitted by the Solid Waste Management Division. The permit assigns an exclusive geographical area to each collector and restricts his activities to that area.

Delta Refuse Service. Delta Refuse Service provides service to the area surrounding Isleton in the southernmost tip of Sacramento County. Their operating office is located in Rio Vista, Solano County, where the owner/operator provides additional refuse collection services.

The owner and three helpers collect from some 150 accounts utilizing one of two rear-loading compactor vehicles: One 16 and the other 20 cubic yard capacity, with attachments for handling bins. The company services approximately 50 commercial accounts and minimal residential accounts. This requires one full day. Collected waste material is deposited at the Grand Island disposal site and the Rio Vista landfill.

Camarillo Sanitary Service. A small portion of the County's Delta Area, including the incorporated city of Isleton and the unincorporated communities of Courtland, Hood, and the residential area of Walnut Grove on the westerly side of the Sacramento River, is serviced by Camarillo Sanitary Service.

The owner/operator and one helper collect refuse from some 500 accounts using a 20-cubic yard capacity, rear-loading compactor vehicle. The collector operates four days per week, requiring one trip to the Grand Island disposal site each day.

The owner also provides caretaker service for the County-leased Grand Island disposal site.

Independent Disposal Company. Independent is the largest of the three South Area collectors. Areas with their corresponding number of accounts include: City of Galt, 1,000 accounts; Elk Grove, 1,700 accounts; Walnut Grove, 250 accounts; Thornton, 200 accounts; Locke, 75 accounts and the surrounding County area, 900 accounts. This represents a total of 4,125 residential and commercial accounts. The service area is divided into four routes, three using rear-loading compactor vehicles and one consisting of commercial accounts using drop boxes of 20 cubic yard capacity. A special vehicle is required for drop-box deposit and retrieval. There are 50 to 55 accounts using drop boxes which are collected once or twice per month. Crews work on a task system.

The owner also operates the sanitary landfill disposal site located near Elk Grove at the southwest corner of Waterman and Bond Roads.

Folsom City Collection Service. The City of Folsom operates its own collection service, serving 2,800 residential and commercial accounts. Folsom disposes of some seven tons of refuse per day at the County disposal site.

The Folsom City Garbage Department is a modest operation in terms of equipment and personnel, but adequate to handle the refuse needs of this compact community.

The operation is as follows: Five routes per day, with two trucks per route, utilizing rear-loaders with compactors. Each truck covers 40 miles--three hundred stops--per day and averages two and one-half trips to the County disposal site per route day.

STREET COLLECTION

The four municipalities and the County provide street cleaning service and curbside leaf and clipping removal. These activities handle approximately 13 percent of the solid waste stream entering landfills and the services are indispensable in terms of community convenience and aesthetics. See table 5-4 for details on street cleaning agencies.

All urban areas of the County are provided curbside service for the removal of leaves, grass clippings, tree trimmings, and the like. Intense agricultural areas and large estate areas provide their own service by composting organic refuse into the soil or hauling to disposal sites. The County Refuse Enterprise provides curbside service concurrently with regular garbage collection. The City of Sacramento, Folsom, and Isleton provide curb service through separate street cleaning departments. The City of Galt provides street pickup by providing a once-a-week, unlimited pickup through Independent Disposal Service.

Street collection in Isleton, Folsom, and the City of Sacramento are supported by general funds (taxes). The County and Galt are supported through user fees. The actual cost of curb service is buried in complicated municipal budgets and thus not visible or felt by the general public, except that the County incorporates charges for these services into their general refuse billing (\$8.00 bi-monthly), while Galt allows Independent Disposal to charge \$1.00 per month for once-a-week, curbside pickup.

The County and the City of Sacramento also provide street cleaning activities in the form of sweeper rigs, street washers, and individual sweepers. The combination of curbside pickup and street cleaning activities provides the public with a convenient means of handling part of their refuse problem.

TABLE 5-4

LITTER AND STREET CLEANING - SACRAMENTO COUNTY, 1974

Controlling Agency	Collecting Agency	Equipment	Pickup Location	Disposal Site	Annual Collection Amounts (tons)				
					Park Garbage, etc.	Parkway Rubbish	Seasonal Leaf Fall	Roadside Litter	Roadside Sweeping
Sacramento County Parks & Recreation	Private collectors Parks & Recreation	Cans, Bins, Drop Boxes Trucks	County Parks, Parkways, Gibson Ranch, etc.	Various Landfills	600	125	included	N.A.	N.A.
Sacramento City Parks & Recreation	Maintenance Division Mobile Crews	Trailer-mounted 6 cu.yd. Containers	City Parks	City Landfill	3,000	included	120	N.A.	N.A.
State Parks & Recreation	Maintenance Div.	N.A.	Folsom and Nimbus Lakes	20% Sac. Co. 80% Placer & El Dorado Counties	200	N.A.	N.A.	N.A.	N.A.
Sacramento County Highways & Bridges	Maintenance Div.	Mobile-sweepers Chippers Trucks	County Roads	County Landfill Elk Grove Landfill Davis Pit	N.A.	N.A.	100	720	12,000
Sacramento City Street Cleaning	Same	Mobile-sweeper Trucks Frontend Ldrs Handcarts	City Street & Sidewalks	City Landfill	N.A.	N.A.	included	included	89,000
Folsom City Street Service	Same	Mobile-sweeper Chipper & Truck	City Streets	Cut & Fill at City Corp. Yard	N.A.	N.A.	included	included	5,200
Isleton City Street Service	Public Works	Dump Truck	City	Grand Island	N.A.	N.A.	N.A.	included	500
California State Transportation Division	Highway Maintenance Private Haulers	Bins	State Highways in Sacramento County	Landfills	N.A.	N.A.	N.A.	84	N.A. (Fill for low spots)

Source: Staff Studies

In the City of Sacramento the curbside wastes are not required to be containerized, thus, especially during the Fall of the year, the aesthetics of the collection service are compromised by the sight of streets full of scattered leaves prior to pickup days. The County requires curbside vegetation to be containerized and thus experiences few problems with scattered trash from curbside deposits.

Overall, the curbside vegetative waste services and the street cleaning services are considered to be dependable, economical, and adequate as they currently function, except in Sacramento City where the non-containerized service is considered by some to be an expensive luxury.

Sacramento County Highway and Bridges Maintenance. A regular program of street cleaning with mobile sweepers is conducted on all roads and streets in the County that are paved and have curbs and gutters. During the months from late October until mid-December a leaf collection program is conducted. This material is disposed of at the County landfill, Waterman (Elk Grove) disposal site, or an abandoned gravel pit at Florin and Jackson Roads.

City of Sacramento Street Cleaning Department. The city's street cleaning program is more extensive than the County's. Yard and tree trimmings are collected from the streets in front of each home, rather than by the refuse collection department as in the County. To accomplish the city's program a full-time staff comprised of 94 positions (seasonal variation) is employed. The department operates Monday through Saturday with staggered shifts practically around the clock: 12:00 midnight until 10:00 p.m. The annual amount of material collected amounts to some 402,500 cubic yards or an estimated 89,100 tons. The material is disposed of at the city's landfill site.

City of Folsom Street Service. The City of Folsom operates one mobile street sweeper and one truck with a wood chipper in its street cleaning

program. Personnel amounts to one supervisor and two drivers. Hours of operation are 8:00 a.m. to 5:00 p.m. on Mondays and Fridays. Some 20 cubic yards per day of vegetation is disposed of in a cut-and-fill operation located at the City Corporation Yard.

City of Isleton Street Service. The City of Isleton's street cleaning service amounts to a two-man crew operating a three-cubic yard dump truck five days per week, Monday through Friday. Approximately six to nine cubic yards of material per day is collected. This is equivalent to about one ton per day or five tons per week. The material is disposed of at the Grand Island disposal site.

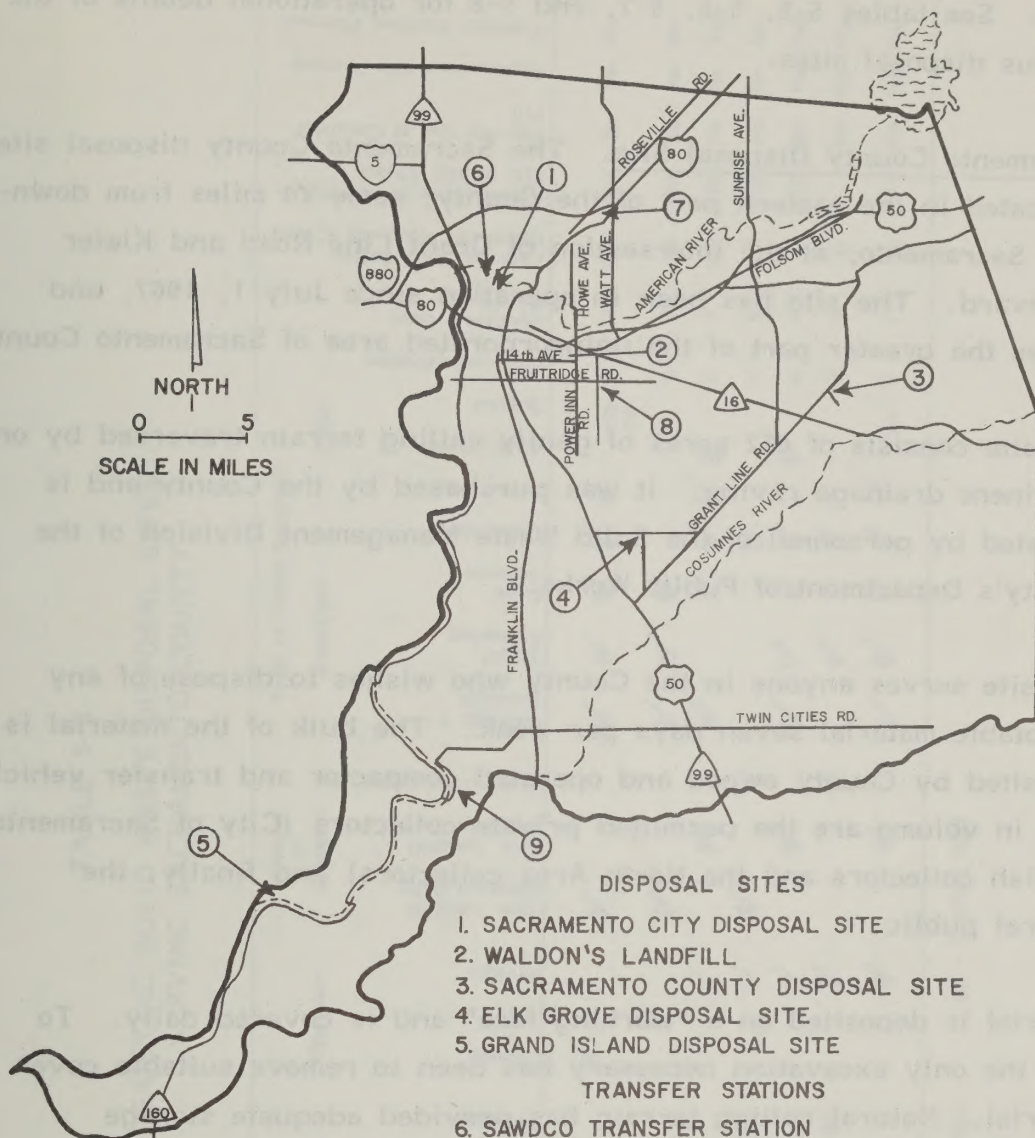
DISPOSAL OF WASTES

Sacramento County is unique in that it has only two major disposal sites (Sacramento County and Sacramento City landfills) serving the entire County. This limitation on sites reduces the potential for environmental problems.

The Grand Island, Elk Grove, and 14th Avenue sites will be closed by 1980. Thus, the County landfill will experience a large increase in wastes entering that site. See Plate 5-4 for a disposal site location map.

The Sacramento City landfill will close by 1982, leaving one major landfill in the County. A one-disposal-site approach to handling County waste requires substantial adjustments in the overall solid waste management system. The major adjustments will be implementation of sufficient and appropriately located transfer stations to provide convenient and economical disposal for the public at large.

The current disposal system handles all the waste generated in an adequate fashion; however, plans must be prepared for the orderly closure of several small sites along with implementation of appropriate alterna-



DISPOSAL SITES

1. SACRAMENTO CITY DISPOSAL SITE
2. WALDON'S LANDFILL
3. SACRAMENTO COUNTY DISPOSAL SITE
4. ELK GROVE DISPOSAL SITE
5. GRAND ISLAND DISPOSAL SITE

TRANSFER STATIONS

6. SAWDCO TRANSFER STATION
7. NORTH AREA TRANSFER STATION
8. FRUITRIDGE TRANSFER STATION (PROPOSED 1976)
9. LOCKE TRANSFER STATION (PROPOSED 1976)

PLATE 5-4
DISPOSAL SITES AND TRANSFER STATION LOCATIONS

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

tives. See tables 5-5, 5-6, 5-7, and 5-8 for operational details of the various disposal sites.

Sacramento County Disposal Site. The Sacramento County disposal site is located in the eastern part of the County, some 20 miles from downtown Sacramento, at the intersection of Grant Line Road and Kiefer Boulevard. The site has been in operation since July 1, 1967, and serves the greater part of the unincorporated area of Sacramento County.

The site consists of 652 acres of gently rolling terrain traversed by one prominent drainage ravine. It was purchased by the County and is operated by personnel of the Solid Waste Management Division of the County's Department of Public Works.

The site serves anyone in the County who wishes to dispose of any acceptable material seven days per week. The bulk of the material is deposited by County owned and operated compactor and transfer vehicles. Next in volume are the permitted private collectors (City of Sacramento rubbish collectors and the North Area collectors) and finally, the general public.

Material is deposited on a "working face" and is covered daily. To date the only excavation necessary has been to remove suitable cover material. Natural rolling terrain has provided adequate storage capacity. Materials received and disposed of at the site are those authorized at the class II disposal site. Of the 350,000 tons deposited annually, the major portion (64%) is domestic in nature. Some 34% is from commercial sources with the remainder composed of material deposited by the general public, some demolition materials and other materials such as tires. An operating plan for the site was completed and published in April, 1975.

TABLE 5-5
EXISTING SOLID WASTE DISPOSAL SITES
SERVING SACRAMENTO COUNTY

Site Identification		Owner			Operator			Method of Disposal	Type of Waste Received										Average Total Daily Quantities Received (Tons)	Approximate Remaining Life of Site (Date)	Planned Use of Complete Fill	Replacement Site Planned	Transfer Stations Planned	
Name	Map Code *	County	City	Private	County	City	Private	San. Landfill Covered Daily	San. Landfill Periodic Cover	Supervised Dump	Garbage & Rubbish	Street Sweeping	Dead Animals	Demolition	Industrial	Agricultural	Special	Site Classification	Operating Days Per Week	Average Total Daily Quantities Received (Tons)	Approximate Remaining Life of Site (Date)	Planned Use of Complete Fill	Replacement Site Planned	Transfer Stations Planned
Sacramento County	B	✓			✓			✓			✓	✓	✓	✓	✓		stp dm	II	7	950	2000	No	No	No
City of Sacramento	A		✓			✓		✓			✓	✓	✓					II	6	635	1985	No	No	No
Elk Grove (Waterman)	D	✓					✓		✓		✓		✓	✓	✓	✓		II	7	120	1979	No	No	Yes
Waldon (14th Ave.)	A			✓			✓	✓						✓				III	5	605	1976	No	No	No
Grand Island	F	✓					✓		✓		✓	✓	✓	✓		✓		II	6	8	1975	No	No	Yes
Davis	B			✓			✓			✓		✓		✓				III	5	45	?	No	No	No
Rio Vista (Solano County)	N.A.		✓				✓		✓		✓	✓	✓	✓	✓		dm	II	?	12	1994	No	No	No

stp - Septic Tank Pumpings

dm - Drilling Mud

* See Plate 5-3

Source: Staff Studies

TABLE 5-6

EXISTING SOLID WASTE DISPOSAL SITES - ACTIVITY SUMMARY

Site Identification													
Name	Map Code *	Site Classification	* * Site Acreage	Original Capacity (cu. yd.)	Remaining Capacity (cu. yd.)	Estimated Life Expectancy (Year)	Max. Depth of Fill (ft.)	Liquid Waste Restrictions	Paved Access Road	Ultimate Land Use Master Plan	Landfill No.	Depth to Ground-Water Table (Ft.)	
Sacramento County	B	II	1. 652 2. 25 3. 627	30,000,000	27,300,000	2000	100	Group 2 Only	Yes	No	-	200	
City of Sacramento City of Sacramento	A	II	1. 84 2. 50 3. 34	3,120,000	1,280,000	1980	15	NA	Yes	No	-	UNK	
Elk Grove (Waterman)	D	II	1. 37 2. 35 3. 2	800,000	128,500	1977	20	NA	Yes	No	-	UNK	
Waldon (14th Ave.)	A	III	1. 40 2. 40 3. 0	1,350,000	222,000	1976	30	NA	Yes	No	-	UNK	
Grand Island	F	II	1. 10 2. 3 3. 2	75,000	25,000	1977	10	NA	Yes	No	-	UNK	
Davis	B	NONE	UNK	UNK	UNK	UNK	UNK	NA	UNK	UNK	-	UNK	

NA - Not Allowed
UNK - Unknown

* See Plate 5-3

**1. Total
2. Acreage Used
3. Acreage Remaining

Source: Staff Studies

TABLE 5-7

EXISTING SOLID WASTE DISPOSAL SITES - ACTIVITY SUMMARY

Site Identification										
Name	* Map Code	Scales Used	Number of Employees	Frequency Refuse Is Covered With Soil	Estimated Daily Tonnage	Estimated Daily Vehicular Traffic	Salvage Allowed	Equipment Used	Hours of Operation	Days of Operation Per Year
Sacramento County	B	Yes	15	Daily	950	320	Yes	3-Crawler Tractor 3-Scraper 1-Grader 1-Compactor 2-Water Truck	10 Hours (8 Months) 12 Hours (4 Months)	365
City of Sacramento	A	Yes	3	Daily	635	None	Yes	2-Crawler Tractor 2-Compactors 1-Scraper 1-Grader	Not Open to Public	312
Elk Grove (Waterman)	D	No	2	Daily	120	110	No	1-Crawler Tractor	9 Hours	365
Waldon (14th Ave.)	A	No	5	Daily	605	None	Yes	2-Crawler Tractor 1-Scraper 1-Water Truck	9 Hours (8 Months) 10 Hours (4 Months)	260
Grand Island	F	No	1	As Rec'd	8	6	Yes	1-Crawler Tractor	7 Hours	312
Davis	B	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK

Note: UNK - Unknown

* See Plate 5-3

Source: Staff Studies

TABLE 5-8

RATE COMPARISON - DISPOSAL SITES AND
TRANSFER STATIONS, 1974

Name	*	General Public			Tires			Bulky Materials	Solid Inert Materials	Liquid Wastes	Municipal Refuse	Min. Charge
	Map Area Code	Station Wagon- Pass. Car	Pass. Car & Trailer- Pickup	Pickup with 2- Wh. Trail.	Pass. Car	Truck	Bulk					
Sacramento County Landfill	B	\$0.50 load	\$1.00 load	\$1.50 load	\$0.20 tire	\$0.40 tire	\$20.00 ton	\$1.40 ton	\$0.90 ton	\$1.40 ton	\$1.50 ton	\$1.50 load
City of Sacramento Landfill	A			NOT OPEN TO PUBLIC - CITY USE ONLY								
Grand Island Disposal Site	F	\$0.50 load	\$1.00 load	\$2.00 load	NA	NA	NA	Varies	\$1.00 cu.yd.	NA	\$1.00 cu.yd.	\$5.00 load
Waldon's (14th Avenue) ++	A	NA	NA	NA	NA	NA	NA	NA	\$0.65 cu.yd.	NA	\$0.65 cu.yd.	\$7.00 load
Elk Grove Landfill (Waterman)	D	\$0.50 load	No Trailers Allowed	Pickup Only \$1.00 load	NA	NA	NA	NA	\$1.00 cu.yd.	NA	\$1.00 cu.yd.	\$0.50 cu.yd.
Rio Vista Landfill	—		OUT OF COUNTY	— SOLANO COUNTY								
TRANSFER STATIONS												
Sacramento County North Area	B	\$1.00 load	\$2.00 load	\$2.50 load	\$0.25 tire	\$0.50 tire	NA	NA	NA	NA	\$5.75 ton	\$2.50 load
SAWDCO	B	NA	NA	NA	NA	NA	NA	NA	NA			

* See Plate 5-3

NA - Not Accepted

++ Waldon's only receives paper and Group III wastes

Source: Staff Studies

The projected life of the site is estimated at 20 to 30 years, depending upon the disposition of existing sites within the County and the remaining life of the city landfill.

Sacramento City Disposal Site. The Sacramento City disposal site is located at 28th and B Streets in the northeast corner of downtown Sacramento, immediately south of the American River.

This disposal site has been in operation since 1949. The method of operation is area fill between levees with daily covers. It is comprised of 84 acres, with 50 acres used and 34 acres available. The site receives an estimated 162,500 tons per year of solid wastes and has a life expectancy of less than seven years. This site is not open to deliveries by the public. Tentative waste discharge requirements for the site were set in June 1975.

Waterman Disposal Site (Elk Grove). The disposal site for the Elk Grove area is located at the southwest corner of Waterman and Bond Roads and is commonly referred to as the Waterman Disposal Site. The site has been in operation for at least 15 years and serves the communities of Elk Grove, Galt, Walnut Grove, Thornton, and Locke as well as the general public in the surrounding County area south of Calvine Road.

The site consists of approximately 37 acres of relatively flat terrain with the major portion already utilized for cut-and-fill operations. It is owned by Sacramento County and is operated by Independent Disposal Company which is also the collector for the Elk Grove area. Personnel used to operate the site consist of one equipment operator and one person who directs traffic and collects fees. The site is open to the public each day of the week.

The bulk of material deposited at the site is from Independent Disposal's collection vehicles. The rest is from the general public with small

amounts from the Elk Grove Park District and County highway maintenance vehicles. Material is deposited in long, narrow, excavated trenches and is covered daily. Material received is that authorized for a Class II disposal site with approximately 44,000 tons deposited annually. The projected life of the site is estimated to be three years.

Grand Island Disposal Site. The Grand Island disposal site is located in the southernmost portion of the County. It is situated on the western point of Grand Island near the City of Isleton. In general, it serves that area of the County from Walnut Grove south, which includes the City of Isleton. The present ten acre site is located on property owned by the United States Army Corps of Engineers.

The site is operated and maintained by Camarillo Sanitary Service. Personnel consists of one caretaker who regulates dumping, collects fees, and conducts a selective salvage operation. The site is open each day of the week except Wednesday. It serves the following: the general public, Camarillo Sanitary Service, the street cleaning department of the City of Isleton, and an occasional truck from the County's Park and Recreation and Highway Maintenance departments.

Material is deposited in excavated pits and is covered weekly or more often if conditions dictate. Materials received and disposed of are those authorized for a Class II disposal site. Five hundred twenty tons are deposited annually.

The disposal site has been the source of many problems. The site is located on property which previously was used to dispose of sand dredges from the river. The sandy cover material makes it impossible to keep refuse covered. Thus, the site is continually plagued with exposed refuse. Occasional open fires and a limited site life add to the problems of the area.

The County Department of Public Works completed a study of these problems and published a report in May, 1974 which concluded that a refuse transfer station would provide the best solution. However, due to the small population of the Delta area, a subsidy from the County would be required to finance the operation; user fees would not be entirely adequate unless such fees were established at a prohibitively high rate.

Waldon Disposal Site (14th Avenue). The disposal site located on 14th Avenue between Power Inn Road and the Southern Pacific Railroad tracks is more commonly referred to as the Waldon Diposal Site or Waldon's Pit. This site resulted from aggregate excavations made years ago. The site originally contained some 34 acres and was 25 to 30 feet below the surrounding property level.

The site can receive limited Group II materials (generally paper and paper products) but is generally referred to as a Class III site (materials resulting from building demolition or from construction waste). The site receives only commercial haulers and is not open to the general public.

The waste material is covered each day with earthen material imported from other areas. The remaining space is very limited with maximum capacity to be reached within the near future, possibly within a year. At that time, the 150,000 to 160,000 annual tons disposed of at this site must be disposed of at some other site, possibly the County landfill or another aggregate pit closer to the metropolitan area.

Summary. It should be noted that disposal conditions present a potential problem. The Sacramento City landfill is closed to the public and has approximately seven years of life remaining. The city has not formulated definite contingency plans to handle their disposal needs when the present site is exhausted. Within a year, the 14th Avenue site will be full and commercial collectors now using this facility will

have to dispose of their wastes elsewhere, most probably at a greater hauling distance. The Elk Grove site is rapidly being depleted, while the Grand Island disposal site is experiencing difficulties which need immediate attention. Chapter Six discusses these problems in detail.

TRANSFER OF WASTES

Increasing population coupled with decreasing landfill capacities requires that the County and cities either seek replacement disposal sites or construct transfer stations. The County has, in the past, chosen to utilize a transfer station system for several reasons: the County landfill has a life expectancy of 25 years (assuming all County wastes are deposited there after 1985); transfer sites are easier to locate than landfills and thus can be made readily available to collectors and private individuals alike; the capital land cost for sanitary landfills is increasing; community activists groups may oppose sanitary landfill site proposals; and with proper location of transfer stations, the haul time for collectors and the public at large can be reduced, thereby reducing costs.

The transfer station system has worked well in Sacramento County. Currently there are two transfer stations, one privately operated in the Sacramento City downtown area, the other County-operated in the North Area. See table 5-9 for activity details on transfer stations.

Sacramento County Transfer Station. Sacramento County operates a transfer station in the North Area of Sacramento County just off Roseville Road near McClellan Air Force Base. The station is situated on a fourteen acre site acquired under a long-term lease from the United States Government through McClellan Air Force Base.

The site is open to the general public as well as commercial haulers and has been in operation nearly two years with the following annual usage: general public, 24,000 tons; Sacramento County Collection Vehicles, 22,000 tons; McClellan Air Force Base, 12,000 tons; and all

TABLE 5-9

EXISTING SOLID WASTE TRANSFER STATIONS

Site Identification		Method of							Type of Waste Received							Waste Classification	Operating Days Per Week	Average Total Daily Quantities Received (Tons)	Salvage Operation
		Owner	Operator	Transfer			Municipal				Other								
Name	* Map Code	County	Private	County	Private	Open Pit	Compactor	Trailer	Garbage & Rubbish	Street Sweeping	Dead Animals	Demolition	Industrial	Agricultural	Special				
Sacramento County North Area	B	✓		✓		✓		✓	✓	NA	✓		✓	NA	NA	II	7	250	Yes
Sacramento Waste Disposal Company (SAWDCO)	A		✓		✓		✓	✓	✓	NA	NA	NA	✓	NA	NA	II	5	145	Yes

* See Plate 5-3

NA - Not accepted

Source: Staff Studies

commercial collection vehicles, 30,000 tons; or 88,000 tons total.

The waste material is dumped into a long, narrow, sunken concrete ramp with an inclined floor. A crawler tractor works within the enclosed area distributing and partially compacting the dumped material. The tractor then pushes the material up the inclined ramp to a drop area in the upper end. The material drops through into a waiting trailer and is further compacted by a backhoe. Each trailer load (90 cubic yards) carries approximately 17 tons of refuse to the County's landfill site at Grant Line Road and Kiefer Boulevard.

Sacramento Waste Disposal Company Transfer Station (SAWDCO).

SAWDCO operates a small transfer station located in downtown Sacramento. Their station uses a receiving hopper and hydraulic ram to compress wastes into 82-cubic-yard transfer vehicles.

The transfer station services only commercial haulers. Present operation is approximately 40,000 annual tons. Cardboard and paper salvage is a part of station operations.

RECOVERY OF WASTES

Recycling, composting, and salvage for reuse are the only methods of resource recovery currently being employed in the County. A number of small to semi-large businesses collect and/or receive recyclables such as ferrous metal, aluminum, glass, newsprint, cardboard, and premium metals. The Solid Waste Management Division has equipped all collection trucks with paper racks and picks up bundled newsprint which is sold to private industry.

A small percentage of the population compost all their organic refuse and return it to the soil. Unfortunately, the current economics and aesthetics of recycling and composting make permitted refuse collection appear very attractive to the average consumer. The motivating force

for individual recycling efforts appears to be philosophical rather than economic.

Recycling businesses come and go with fluctuating markets. When prices are high there is no problem in moving recyclable materials. When prices are down, however, it is difficult for citizens to locate retrievers of recyclable materials. See table 5-10 for major resource recovery activities.

Metals. A large ferrous metal processor, Los Angeles By-Products, operates ferrous metal separators at the City and County disposal sites which recover approximately 425 tons per month of tin cans and miscellaneous scrap metal. This company also receives at their Antelope processing plant another 1,025 tons per month of scrap metal from Oakland, San Francisco, and Martinez. The average monthly production of 1,450 tons is shipped via rail cars to the Anaconda Copper Mines in Nevada for use in copper ore recovery.

Glass. The California Industrial Recycling Company (CIRCO) operates a glass brokerage office in Sacramento and ships approximately 200 tons per month of used glass to the Madera Glass Company (Fresno) for recycling. Industrial glass pickup averages 100 tons per month. SAWDCO provides the collection service. Another 100 tons per month is delivered by the public to collection points in the County. CIRCO contracts with a local rock and ready mix operator for storage and hauling.

Wood. Wood waste from mills and construction work is received and processed into woodchips by the Kelbro Corporation in their Sacramento plant. The entire production of 200 to 220 tons per day is hauled to Fiberboard Corporation in Antioch. Approximately 60% of that production comes from Sacramento County. Other sources of scrap are wood boxes, wood pallets, and clean construction and demolition material

TABLE 5-10

MAJOR RECOVERY ACTIVITIES

Name of Company	Waste Recycled	Ultimate Use	Operation Day	Operation Hrs.	Source of Materials	Amount Processed (Tons/Mo.)	Disposition	Area Served	Notes & Comments
L.A. By-Products	Ferrous Metal	Copper Ore processing	M-F	7-8	Various Landfills	1,450 (425 from Sac. Co.)	Anaconda Copper Mines, Nevada	Delta Bay Area	Very reliable market - pays landfills for materials.
Circo	Glass	Glass Cullett	Varies	Varies	Industry & Individuals	200	Madera Glass Co.	Sacramento County	New Company - Mkts. to be developed
Kelbre	Wood	Wood Chips	M-F	8-5	Mills - Demolition & Construction	4,200	Fibreboard, Antioch	Northern California	60% of wood comes from Sac. Co. 8-10 tons/mo. mtl. from wood solid.
Setzer Forest Products	Wood	Presto-logs			Mill Operation on-Site	830	Distributed Locally	Home Plant	Established Market
Nikkel Moulding Co.	Wood	3-Hour Logs			Moulding Operation On Site	230	Distributed Locally	Home Plant	Established Market
Consolid. Fibres, Inc.			INFORMATION NOT AVAILABLE						
Independent Paper	Cor. Cardbd. Newsprint IBM Cards	Paper	M-F Sat.	8-3:15 7-10:30	Businesses Individuals Government	1,200	Fibreboard, Stockton	SAC, County Mostly SAC. City	600 ton-cor., 400 ton-newsprint Bailed & 200 ton
Keyes Fibre Co.	Newsprint	Paper	Mon. thru Sun.	24 Hrs. per day	Sacramento City Businesses Outside County	830		Unknown	Hydropulper Operation 500 tons/mo. Sac. City, 330 tons/ mo. - out of County
Pacific Coast Waste Paper	Cor. Cardbd. Newsprint Hi-Grade Paper	Paper	M-F Sat.	6-8 7-1	Businesses	500 to 1,300	Various Paper Products	Sacramento County 98%	
SAWDCO	Newsprint Cor. Cardbd.	Paper	M-F	8-5	Mostly by Private Indus.	520	Fibreboard, Stockton & Antioch	Sacramento City & County	170 tons/mo. newsprint, 350 tons/ mo. Cor. Cardbd., 60 tons/ mo.
Sacramento Rendering Co.	Animal Waste		M-F	8-5	Local Meat Processors	400-500			Fat and Bone Rendering
Capitol Coors Co.	Aluminum Beverage Cans	Aluminum Cans			Individuals & Wholesale Houses	50	Metal Shredding Plant in San Jose	Sacramento & Yolo County	
Reynolds Metal Recycling Center	Clean Alum. & Aluminum Beverage Cans	Aluminum Cans			Individuals	35	Metal Shredding Plant in Hayward	Sacramento County	Shredded Metal shipped to Reynolds Metal Listerville, Alabama

Source: Staff Studies

from which non-wood materials have been previously removed. After grinding, the woodchips are moved on conveyer belts, sorted, grade by size, and loaded into transport trailers.

Two mills in Sacramento County, Setzer Forest Products and the Nikkel Moulding Company, are converting scrap lumber, wood shavings, and sawdust from mill operations into a saleable product; the wood waste is ground and combined with additives and a binder to make fireplace logs. Total annual production is approximately 12,750 tons or an average of 50 tons per day.

Paper. Major paper salvage companies operating in Sacramento County are Consolidated Fibres, Inc., Independent Paper Stock Co., Pacific Coast Waste Paper Co., Inc., and the Sacramento Waste Disposal Co. Monthly tonnage through these centers averages 1,200 tons of cardboard, 1,000 tons of newspaper, and 850 tons of high grade paper for a total of 3,050 tons per month.

Animal Waste. The Sacramento Rendering Company processes between 400 and 500 tons per month of animal waste collected from within the County. Florin Tallow of Modesto processes animal waste from Sacramento County. The precise amount is not known but is thought to exceed 400 to 500 tons per month.

LITTER

Litter results from the casual act of discarding small quantities of material such as beverage bottles, newspaper, or food wrappers, as well as illegal dumping of house and garden waste, usually in large quantities.

In Sacramento County the responsibility for policing and collecting litter is divided between a number of departments. The Department of Community Health (DCH) staffs a full-time Litter Control Officer who investi-

gates complaints and determines problem areas. The Department of Public Works Highway Maintenance Division is responsible for collecting the litter which accumulates on the County's rights of way. The Department of Parks and Recreation is responsible for litter and solid waste that accumulates in County parks.

Current Litter Action Program

In Sacramento County the litter problem can be broken down into several categories:

1. Public Streets.
 - a. Locally maintained.
 - b. State and interstate maintained.
2. Public property.
 - a. School, parks, office property, etc.
3. Private property.
 - a. Occupied.
 - b. Vacant.
4. Abandoned property in tax lien.
5. River-levee property.

Littering on the above categories of property is abated through requests for service (complaints usually to the DCH) from other governmental agencies.

In all of the categories, if the litterer can be identified and located, the problem is abated through official notices and/or citation into court. However, most of the time the litterer cannot be identified and/or located and governmental cleanup is the only resource to abatement of the litter problem. The DCH has the responsibility of coordinating litter activities within the County.

Public Streets - Locally Maintained. Within the incorporated cities, the cities' street maintenance departments are requested to abate all litter problems associated with public streets which cannot be resolved through other means.

Within unincorporated areas, the Highway Maintenance Division of the Public Works Department is requested to abate all litter associated with roads which cannot be resolved by other means.

The cities and the County have ongoing street maintenance and cleaning operations and requests by the DCH do not unduly burden these activities.

Public Streets - State and Interstate. All such highways are routinely maintained and cleaned by the State Department of Transportation, Division of Highways. All litter problems associated with these highways which cannot be abated through other means are referred to the State Department of Transportation. While the ongoing litter problem for the Department of Transportation is significant, the involvement by the DCH in abating problems associated with highways is minimal and referrals are very infrequent.

Public Property - Parks, Schools, Etc. All littering associated with public property is abated through the routine cleaning activities of relevant agencies. The DCH Litter Control Program gets involved when dumping occurs on this category of property and only when the litterer is observed in the act and can be identified from the contents of the litter.

Private Property - Occupied. All littering in this category is abated by the DCH through official notice and/or citation into court of the renter or owner, whichever is appropriate in the particular case.

When the dumping is by an outside party who cannot be identified and/or located, the owner is held responsible to abate the litter problem.

Private Property - Vacant. If the litterer cannot be identified and/or located, the property owner is held responsible for abatement and issued

an official notice and/or citation to appear in court.

If the litter on private property contains a large amount of putrescible material and it is not removed as requested by official notice, the DCH can invoke the "Fly Ordinance" and have the material removed. The expense is borne by the property owner either through direct billing or by placing a lien on the property.

Abandoned Property - In Tax Lien. This category represents a special problem. The state and local municipalities have no obligation to maintain the property and the owner has already defaulted on his obligation.

In minor littering problems, the DCH simply removes the debris. In major dumping problems, the local Departments of Public Works are requested to abate the problem.

River Levee Property. If the litterer cannot be identified and/or located, the problem is referred to the local maintenance districts.

Summary

Littering in Sacramento County is abated by the DCH through complaints and referrals. There is no litter patrol or other affirmative action program for deterring and/or discovering litterers in the unincorporated area of the County. The City of Sacramento has a Litter Control Officer and conducts a neighborhood cleanup program in an effort to deter littering.

At the present time, the DCH has no educational program in schools or elsewhere which serves to deal specifically with the problem of littering. The DCH, along with local citizen groups, does encourage neighborhood cleanup days. When this type of effort is coordinated with city and

County refuse departments, the results are very satisfactory.

SPECIAL WASTES

Several categories of solid waste have been found to necessitate special handling and, therefore, have a significant influence on present and future planning. These wastes, although comprising a small percentage of the waste stream, pose disproportionately large collection and disposal problems. A description of these problem wastes follows.

Cannery Wastes. In the past, haulers dumped cannery waste in piles for cattle feed or spread it over crop land as a soil conditioner. The volume of waste was frequently more than the cattle could consume, or the ground could quickly absorb, and within several days, the wastes would putrify. Large numbers of flies were attracted to the waste, which then became a significant source of fly production.

Based upon research conducted by the Sacramento County Environmental Health Programs in conjunction with the Department of Vegetable Crops - University of California at Davis, guidelines have been established to govern the disposal of organic cannery wastes in Sacramento County.

Surveillance of both hauling and disposal operations is conducted by appropriate public agency personnel. The aforementioned guidelines are enforced throughout the cannery season.

Abandoned Vehicles. A special program to remove abandoned vehicles from the community was launched in 1973. The program is financed by a statewide one-dollar increase in vehicle registration fees.

In Fiscal Year 1973-74, Sacramento County processed 2,800 vehicles. There are an estimated 1,400 vehicles abandoned in Sacramento County per year. Thus, the special program handled 1,400 vehicles which had been abandoned in prior years.

Group 1 Wastes (Hazardous Wastes). Group 1 wastes consist of or contain toxic substances (lethal, injurious, or damaging to man or other living organisms including plants, domestic animals, fish and wildlife) and substances which could significantly impair the quality of usable waters.

Examples include, but are not limited to, the following:

1. Municipal origin.
 - a. Saline fluids from water or waste treatment and reclamation processes.
 - b. Community incinerator ashes.
 - c. Toxic chemical toilet wastes.
2. Industrial origin.
 - a. Brines from food processing, oil well production, water treatment, industrial processes and geothermal plants.
 - b. Other toxic or hazardous fluids from industrial operations such as spent cleaning fluids, petroleum fractions, chemicals, acids, alkalies, phenols and spent washing fluids.
 - c. Substances from which toxic materials can leach, such as process ashes, chemical mixtures and mine tailings.
 - d. Rotary drilling muds containing toxic materials.
3. Agricultural origin.
 - a. Chemicals such as pesticides or chemical fertilizers.
 - b. Discarded containers of chemicals, unless adequately cleaned.
4. Other toxic wastes such as compounds of arsenic or mercury or chemical warfare agents.

Sacramento County has very little known potential for the generation of Group 1 wastes other than pesticide containers. A few years back, the disposal of these containers presented a problem which led to a search for a Class I disposal site. The recent adoption of the procedure for rinsing and draining the containers, thus allowing their disposal in a Class II landfill site has eliminated the problem; therefore, the need

for a Class I site depends largely on further definition and analysis of Group 1 wastes in Sacramento County.

Industrial activity in the County is largely limited to food processing and canning plants. With notably few exceptions, wastes are suitable for disposal through the sanitary sewerage system or direct application to land.

Certain liquid chemical wastes are generated at McClellan Air Force Base and the U.S. Army Depot that would fall within the Group 1 waste classification. These wastes are treated at the industrial waste treatment facility at McClellan. The resultant sludge is inert and is presently disposed of in a landfill on McClellan property. Provisions have been made to receive the sludge material, if McClellan so desires, at the North Area Transfer Station.

Sacramento County currently has no system for the monitoring and/or discovering of hazardous wastes. Private industry and the public sector utilize what might be referred to as an "honor system." That is, in the absence of a Class I disposal site the private and public sectors must haul their hazardous waste out of the County; the closest sites being located at Martinez and Fresno. Without "regulation" it is impossible to judge the merits of the "honor system."

A liquid waste transfer station developed by American Waste Container Service went into operation in July of 1975 and plans to operate twenty-four hours a day, seven days a week, and serve eight counties contiguous to Sacramento County. The operation is located in the eastern region of the County and can handle most liquids, but specializes in hazardous waste liquids.

This transfer station has six tanks of various sizes with a total capacity of 25,000 gallons, and is currently handling approximately 12,000 gallons

per month (some of which are received in 55 gallon drums). Future plans call for expansion of on-site storage to over 40,000 gallons. The wastes are hauled by tanks or flatbed (in drums) to Industrial Tank at Martinez for final processing and/or disposal.

Among the wastes handled are hydrocarbons (cleaning fluids, etc.), acids, cyanides, caustics, explosives (limited), and contaminated water. The cost of transfer can run from \$10.00 to \$250.00 per ton, depending on the type of waste.

Infectious Wastes. The DCH currently enforces locally devised rules and regulations related to the removal and disposal of infectious wastes. The primary targets of these rules and regulations are acute and convalescent hospitals. Although consideration has been given to the need for control of veterinary hospitals, physician's offices and other medical or paramedical facilities, no action has been taken to date.

The California State Administrative Code, Title 17, directs the local DCH to review, approve, and certify the methods of infectious wastes disposal employed by community health facilities. The County DCH's rules and regulations limit the disposal of infectious wastes to one or a combination of the following five methods:

1. Grinding and disposal through an approved sanitary sewer.
2. Incineration of properly stored wastes in an incinerator permitted by the Sacramento County Air Pollution Control District.
3. Storage in and removal in an approved compactor.
4. Isolated storage and approved transportation to a sanitary landfill dump.
5. Sterilization (autoclave) prior to storage and removal.

The Sacramento County DCH has certified acute and convalescent hospitals for disposal of infectious wastes. All of the above options are employed to some degree in the County, except option number one.

The DCH considers any item contaminated with human or animal patient excrement, patient exudate, patient expectorant, etc. to be infectious or potentially infectious, and therefore such items require infectious wastes handling techniques.

Bulky Wastes. Bulky wastes include demolition and construction debris, large appliances, tree stumps, and timbers. They are classified as Group 2 if they are a chemically or biologically decomposable material such as tree stumps and timbers. Bulky wastes which are inert, such as large pieces of concrete, are classified as Group 3 wastes. All local collection services offer special service for the removal of bulky wastes. Some special handling is required at disposal sites.

Dead Animals. The responsibility for removing dead animals from property falls on the owner of the animal or the owner of the property depending on a number of circumstances. In Sacramento County all dead animals are taken to one of two reduction companies or, in the case of small animals, the County landfill. There is minimal incineration of small animals at the County Animal Control Center.

Pesticide Containers. Pesticide containers may be delivered to landfills. If the containers are empty and thoroughly cleansed, they can be crushed by the landfill equipment and disposed of along with the other Group 2 solid wastes at a Class II landfill. If they contain any pesticide, they have to be disposed of in a Class I sanitary landfill.

Volatile and Flammable Wastes. Some wastes, such as paints, paint residues, and dry cleaning fluids, are volatile or flammable. They are usually derived from industrial processing or commercial establishments. Highly flammable or volatile materials are taken to a Class I landfill in other counties at the present time.

Water and Waste Water Treatment Plant Sludges. Sludge is not produced at water treatment facilities in Sacramento County; backwashings are diverted to sewers. Dewatered, digested sludges (50 tons per day) received from wastewater treatment plants are disposed of by application to land; none goes to landfills. The problems associated with the handling of sewage sludge in Sacramento County are in the process of resolution by the Sacramento County Regional Sanitation District.

Radioactive Wastes. Radioactive wastes are generated by institutions such as hospitals and by the Rancho Seco Nuclear Electric Plant. The users of radioactive material are highly controlled through Federal licensing procedures. The wastes are then taken to an Energy Research and Development Administration approved disposal site.

Explosive Materials. Explosive materials which must be disposed of are generated at industrial facilities which use them in fabricating certain items or in mining operations. Military installations also generate explosives which are generally disposed of on-site. Police departments and the County Sheriff's Department have small amounts of explosives which they have confiscated or are asked to dispose of.

Septic Tank Pumpings. The Sacramento County DCH registers all individuals who engage in the cleaning of septic tanks, cesspools, and seepage pits, and the removal of waste therefrom. The removal of wastes from chemical toilets, privies, grease traps, sewage drainage systems and seepage pits are also controlled under this permitting authority.

The majority of these wastes are dumped at the County landfill; however, dumping into a manhole may take place when the registrant has a permit from a sanitary district or municipality allowing this type of dumping.

There are currently 23 permittees in the County providing this type of service. The tonnage of waste generated, and the breakdown on the

quantities of waste going out of County, or into manholes and disposal sites are not known. No wastes of this type are imported into Sacramento County.

Industrial Wastes. There is very little industrial activity in Sacramento County. The major industrial operations are: Aerojet-General Corporation (3,200 employees), four canneries (total 4,300 employees), and Procter and Gamble (400 employees).

There are a number of light industrial operations in the County, but the bulk of manufacturing and processing activities must be typified as commercial in nature, rather than industrial.

Industrial wastes are not believed to have a significant impact on the solid waste stream. Information in this regard is not complete but Table 5-11 provides data on the quantities and types of solid wastes produced by various industrial and quasi-industrial operations.

AGRICULTURAL WASTES

Agricultural waste may be divided into animal waste and crop waste. Based on discussions with representatives of the University of California Farm Advisory Service, the California Farm Bureau Federation, and the Sacramento County DCH, there do not appear to be significant problems associated with the generation and disposal of agricultural wastes in Sacramento County.

If, however, the burning of rice stubble were banned and this residue were introduced into the County solid waste stream, management problems could develop. The nature of these problems would depend on a number of variables, the configuration of which cannot be predicted.

Animal Waste. The Central Valley Regional Water Quality Control Board has been involved in an agricultural waste control program for the past

TABLE 5-11

LIGHT INDUSTRIAL-MANUFACTURING-PROCESSING

Name	Product/Activity	No. of Employees	Type of Waste Material	Ave. Daily Amount (Tons)	Name of Collection Agency	Ultimate Disposal
1. Aerojet Liquid Rocket Co. Aerojet Solid Propulsion Co.	Rocket Research & Develop - Transport.	3,200	Refuse Waste Rocket Fuels	20.7 ?	Self Self	San. Landfill Aerojet Prop. - Fuels Burned
2. Alum-A-Form Co.-Elixir Ind.	Parts Acc for RV's	45	Wood, Steel, Paper	11.0	SAWDCO	County Landfill
3. American Can Co.	Metal Cans	30	Scrap Tin Plate Refuse	1.33 0.05	SAWDCO SAWDCO	Salvage County Landfill
4. American Poly-Therm Co., Inc.	Plastics, Fabrication	30	Refuse	0.12	SAWDCO	County Landfill
5. Assoc. Metals Co. of California	Scrap Metal Processing	55	Wood Scrap	5.00	Self	County Landfill
6. Big "O" Tire Co.	Retread Tires	42	Refuse, Scrap Rubber	0.08	SAWDCO	County Landfill
7. Brookside Enterprises, Inc.	Wine Processing, Bottling	45	Paper, Glass, Refuse	0.20	Sanitary Disp.	County Landfill
8. California Liquid Gas Corp.	Liquified Petrol. Gas	150	Refuse	0.10	Suburban Disp.	County Landfill
9. Clauss & Kraus, Inc.	Sausage & Meats	60	Refuse	0.50	Greene's Waste Co.	County Landfill
10. Continental Chemical Co.	Ind. Cleaning Comp., Chem	60	Refuse	0.05	Self	County Landfill
11. Elk Grove Meat Co.	Meat Packing	50	Animal Waste	3.00	Self	Elk Grove Landfill
12. Foremost Foods Co.	Dairy Products	225	Paper, Glass, Refuse	0.50	City of Sacto.	City Landfill
13. G-Z Products, Inc.	Plastic & Metal Prod.	100	Paper, Wood, Metal	0.50	Self	County Landfill
14. Gerlinger Motor Parts, Inc.	Industrial, Machine Works	35	Scrap Metals Refuse	0.05 0.05	Sold for Salvage SAWDCO	County Landfill
15. Gilmore Steel Corp.	Fabricated Steel Prod.	100	None	None	- -	- -
16. Goodyear Tires	Retread Tires	40	Paper, Rubber Dist. Mtl Junk Tires	0.80 0.50	SAWDCO Self	County Landfill County Landfill

Source: Staff Studies

TABLE 5-11 CONTINUED
LIGHT INDUSTRIAL-MANUFACTURING-PROCESSING

Name	Product/Activity	No. of Employees	Type of Waste Material	Ave. Daily Amount (Tons)	Name of Collection Agency	Ultimate Disposal
17. I.T.T. Continental Baking Co.	Bakery	395	Refuse Corrugated Cardboard	0.25 0.10	SAWDCO Greene's Waste Co.	County Landfill Salvage
18. Kaufman & Broad Home Systems, Inc.	Mobile Home	90	Wood Scraps	1.00	Sanitary Disp.	County Landfill
19. Keyes Fibre Co.	Moulded Pulp	200	Refuse	1.00	SAWDCO	County Landfill
20. Kramer Carton Co.	Folding Paper Boxes	100	Misc. Refuse Foil, Cardboard, Wire	0.25 0.05	SAWDCO Sac. County	County Landfill County Landfill
21. Lifetime Doors, Inc.	Doors	196	Refuse	0.01	Self	County Landfill
22. Monarch Institutional Foods	Canned and Frozen Foods	110	Refuse	0.05	SAWDCO	County Landfill
23. Nikkel Moulding Co.	Wood Mouldings	100	Wood Scraps, Paper, Wire	2.50	Sanitary Disp.	County Landfill
24. Pacific Forest Products	Signs	40	Paper & Plastic Scraps	0.10	American Waste Co.	County Landfill
25. Setzer Forest Products	Wood Products	150	None developed	- -	- -	- -
26. A. Teichert & Son, Inc.	Ready Mix Conc. Aggregates	1,150	Scrap Metal Misc. Refuse Crankcase Oil	1.00 0.05 0.40	Sold for Salvage SAWDCO Sold for Salvage	County Landfill
27. Tom's Hydraulic Supply, Inc.	Hydraulic Supplies	35	Misc. Refuse	0.10	Elk Grove Disp.	Elk Grove Landfill
28. Western Kraft Corp.	Corrugated Fibre Boxes	100	Waste Paper Misc. Refuse	10.00 0.05	Sold for Salvage SAWDCO	County Landfill
29. Wood Products Co.	Laminate Counters	45	Misc. Refuse	0.10	Self	N. Area Trans. Station
30. Yancey Company	Roofing	125	Misc. Refuse Roof Tear-off	0.50 0.20	SAWDCO Self	County Landfill

Source: Staff Studies

two years in and around Sacramento County. The program is designed to achieve adequate control of wastewater from all confined animal feeding operations and more recently, irrigation return flow water from irrigated areas of 3,000 acres or more.

The animal waste control program was initiated with a survey of the region's 2,300 plus dairies and 57 feedlots. The Regional Board has received voluntary compliance with the California State Water Resources Control Board's "Minimum Guidelines for Protection of Water Quality from Animal Wastes" from all but approximately 40 dairies.

All feedlots are in compliance as of this date. Other livestock operations, including poultry and hogs, are currently being surveyed for the same type of voluntary compliance program.

Operations not voluntarily complying with the guidelines will receive a formal enforcement program having the capability of levying fines of up to \$6,000 per day for continued non-compliance.

Sacramento County has 115 dairies and three feedlots. As of 1974, of the 20 dairies and two feedlots in the County, not originally in compliance with the guidelines, all have complied.

Crop Wastes. Information regarding crop production and potential waste problems is sketchy in Sacramento County. However, it is known that residue associated with most crops is incorporated into the soil during ongoing tillage operations.

A major exception is the 10,000 acres of rice stubble which is burned mostly during the mid to late Fall of the year. Most of this acreage lies north of Sacramento City in the Natomas area.

MILITARY ORGANIZATIONS

There are three military installations within Sacramento County which produce 2.7 percent of the County's municipal waste. McClellan Air Force Base is located just northeast of Sacramento City and is the headquarters for the Sacramento Air Logistics Center, Air Force Logistics Command. Mather Air Force Base is located some 12 miles east of downtown Sacramento and is a major installation for advanced navigational training. The United States Army Signal Depot, located in the far eastern portion of the City of Sacramento, serves as the issuing and storage operation for U.S. Army signal equipment. See table 5-12 for details on military bases.

McClellan Air Force Base. All solid waste generated on-base is delivered to the North Area Transfer Station by Air Force vehicles operated by Air Force personnel. Vehicles used to collect and deliver wastes are: two drop-box prime movers (dump-system type), four prime movers with large flatbed trailers, and four dump trucks. Waste material ranges from domestic-type garbage to demolition and construction debris and averages just over forty tons per day, Monday through Friday.

Mather Air Force Base. The Government contracts for the collection and disposal of solid waste materials generated from base activities and from the housing development units on the base. The collection contractor is U.S. Eagle Waste Removal Company from Vacaville, California. The contractor operates two rear-loading compactor vehicles and one front-loader, bin-attachment compactor vehicle with a capacity of 42 cubic yards. Operations are conducted Monday through Friday and service some 1,350 residential units and approximately 200 bins. An average of 19 tons of waste material is disposed of at the County's landfill site each day.

U.S. Army Depot. The U.S. Army uses two front-loading compactor vehicles operated by Army personnel to deliver approximately 5.5 tons

TABLE 5-12
MILITARY WASTE COMPOSITION

Name	Product/Activity	No. of Employees	Type of Waste Material	Ave. Daily Amount (Tons)	Name of Collection Agency	Ultimate Disposal
MILITARY						
1. Mather Air Force Base	Navigator Training	Military 7,100 Civilian 1,800	Household, Commercial	11.50	U.S. Eagle	County Landfill
			Bones & Tallow	0.10	U.S. Eagle	Sac. Rendering Plant
			Baled Cardboard	1.50	Recycled	
			Edible Garbage	0.15	Varies	Local Hog Ranches
			Dry Sludge	0.10	-	Compost-Grnd. Maint.
			Construction Debris	1.33	SELF	On-Base Landfill
			Used Oils	1.00	Refinery Serv. Co.	Recycled
2. Sacramento Army Depot	Signal Equip. U.S. Army	Military 140 Civilian 3,000	Misc. Refuse	5.50	SELF	County Landfill
			Waste Coustics, oils, paints, thinners, cyanides, etc.	0.10	SELF	Western Contra Costa County Class I Site
3. McClellan Air Force Base	Aircraft Maintenance	Military 5,206 Civilian 14,788	Paper	2	U.S. Paper Recyclers King Recycle, Inc.	Recycle
			Scrap Wood	12	SELF	Some Recycle at Transfer Station
			Misc. Paper	6	SELF	
			Mixed Refuse	38	SELF	Transfer Station

Source: Staff Studies via military information offices

of refuse per day at the County's landfill site. Collection operations occur Monday through Friday each week.

FINANCIAL ANALYSIS OF EXISTING SYSTEM

This section estimates current annual costs of the solid waste collection and disposal system in Sacramento County. The estimates represent a base against which the cost of proposed system changes may be compared.

Collection and Disposal Rates. The total waste collection and disposal rates in the County are summarized in table 5-13, which divided total landfilled waste into "collected refuse" and "other solid waste."

Collected refuse is the 65 percent of landfilled waste which is handled by conventional collectors. The other solid waste category is composed of street sweeping and privately hauled waste which is handled by the disposal system. The disposal system is a combination of transfer stations and landfills. The total waste flow shown in table 5-13 is all landfilled solid waste. Agricultural waste, recovered materials, and hazardous materials which do not enter landfills are not shown in table 5-13.

Cost Estimating Methods. For purposes of analysis the cost of the collection and disposal system are divided into five parts: 1) collection, 2) haul, 3) disposal, 4) regulation, 5) planning. This five part cost analysis will aid in evaluating proposals to improve or change the solid waste system. The five parts, though interrelated in a technological sense, represents five distinct solid waste management processes against which changes can be proposed and evaluated.

Disposal. Transfer station and landfill costs were lumped together as future proposals for change may replace existing landfills with transfer stations. Thus, a transfer station is just a higher-technology disposal site. Where a transfer station is used, the costs of transfer

TABLE 5-13

1975 SOLID WASTE COLLECTION AND DISPOSAL SUMMARY¹

Service Area	1975 Pop. ²	Collected Refuse					Other Solid Waste to County Landfills ³		Total Disposal	
		Residential		Commercial		Total				
		Pounds/ Capita/ Week	Tons/ Week	Pounds/ Capita/ Week	Tons/ Week		Pounds/ Capita/ Week	Tons/ Week	Pounds/ Capita/ Week	Tons/ Week
A City of Sacramento	267,700	12.8	1,710	18.4	2,460	4,170	18.3	2,450	49.5	6,620
B North Area of County	381,700	12.8	2,450	12.1	2,305	4,755	9.0	1,720	33.9	6,475
C City of Folsom	9,050	12.2	55	3.3	15	70	17.7	80	33.1	150
D Independent Disp. Area	21,800	13.8	150	10.1	110	260	44.0	480	67.9	740
E Camarillo Disp. Area	2,050	9.8	10	4.9	5	15	35.1	37	50.7	52
F Delta Refuse Area	2,070	9.7	10	4.8	5	15	36.7	38	51.2	53
Total	684,370	12.8	4,385	14.3	4,900	9,285	14.0	4,805	41.2	14,090 ⁴

1 - All tonnages were derived from data provided and checked by the Solid Waste Management Division.

2 - Population estimates by the Solid Waste Management Division.

3 - Includes street sweepings (yard waste).

4 - Total does not include 130 tons per week from out of county.

Source: Bartle Wells

include not only the attendant, equipment, and haul to disposal site, but the cost of disposal and the landfill as well.

Disposal costs were estimated by the utilization of disposal charges. This estimate is based on the assumption that charges represent the actual costs--both capital and operating--of operating a disposal facility. This assumption is not true for the County landfill and transfer station where charges at the disposal facility are set to subsidize the transfer station operation. With private disposal sites such as the SAWDCO transfer station or Waldon's landfill, actual costs were not available (proprietary information). Therefore, charges at each private facility were assumed to equal the costs of each facility (the potential margin for error in financial analysis of private industry operations is, thus, at least equal to their margins of profit).

Table 5-14 is a summary of the charges per ton at each disposal site in the County. The disposal charges shown in Table 5-15 are calculated on a weekly basis and on an average charge per ton basis. Note that for Area B, the disposal charge for the public collector is a weighted average of charges at the County landfill and County transfer station.

Haul. Haul costs are the costs of transporting refuse from the end of a collection route to a disposal site, whether that site is a transfer station or a landfill. In general, haul costs depend upon the type of equipment, the crew size, and the speed and length of haul. Table 5-16 lists estimated haul costs of refuse collection in the County. It is based on several working assumptions: the data for total haul mileage to a disposal site by each carrier, the weight capacity of trucks estimated by converting volume capacity to weight according to reasonable or known conversion rates, the operating costs per ton-mile adjusted to reflect the age and capacity of the operating fleets, driving time estimated on the basis of 25 miles per hour, and wage rates including fringe benefits.

TABLE 5-14

DISPOSAL RATES

	Disposal Charge/Ton
Sacramento landfill ¹	\$1.20
SAWDCO transfer ²	7.50
County transfer ³	5.75
County landfill ³	1.50
Waldon's landfill ⁴	2.00
Elk Grove landfill ⁴	4.00
Grand Island ⁴	4.00
Out of county ⁴	4.00

1 - Based on budget estimate of \$230,000/year to operate landfill which receives 198,100 tons/year.

2 - Estimate of actual cost.

3 - Actual rate/ton.

4 - Converted from rates/cubic yard.

Source: Bartle Wells

TABLE 5-15
1975 TOTAL DISPOSAL CHARGES

	Total Disposal Charges/Week	Average Charge/Ton
A. City of Sacramento		
1. Public collector	\$ 2,520	\$1.20
2. Private collectors	5,560	2.69
3. All others	4,150	1.69
Total or Average	<u>\$12,230</u>	<u>\$1.85</u>
B. North Area of County		
1. Public collector	\$ 5,705	\$2.28
2. Private collectors	5,390	2.39
3. All others	5,090	2.96
Total or Average	<u>\$16,185</u>	<u>\$2.50</u>
C. City of Folsom		
1. Public collector	\$ 75	\$1.50
2. All others	150	1.50
Total or Average	<u>\$ 225</u>	<u>\$1.50</u>
D. Independent Disposal Area		
1. Collector	\$ 1,040	\$4.00
2. All others	1,920	4.00
Total or Average	<u>\$ 2,960</u>	<u>\$4.00</u>
E. Camarillo Disposal Area		
1. Collector	\$ 48	\$4.00
2. All others	240	4.00
Total or Average	<u>\$ 288</u>	<u>\$4.00</u>
F. Delta Refuse Area		
1. Collector	\$ 32	\$4.00
2. All others	180	4.00
Total or Average	<u>\$ 212</u>	<u>\$4.00</u>

Source: Bartle Wells

TABLE 5-16
1975 HAUL COSTS FOR COLLECTED REFUSE

Service Area	Haul Miles/ Week	Tons/ Load	Ton- Miles/ Week	Operating Cost \$/ Ton-Mile	Equip. Cost \$/Week	Haul Time Hours/ Week	Crew Size Men/ Trip	Wage Rate \$/Hour ¹	Labor Costs \$/Week	Total Haul Cost \$/Week	Collected Tonnage/ Week	Total Haul Cost \$/Ton
A. City of Sacramento												
1. Public collector	5,620	3.4 ²	19,100	.14	\$2,670	225	3.0	\$12	\$8,100	\$10,770	2,100	\$ 5.13
2. Private collectors	9,100	6.0	54,600	.09	4,910	365	1.5	12	6,600	11,510	2,070	5.56
B. North Area of County												
1. Public collector	7,910	6.9 ³	54,600	.10	\$5,460	320	2.0	\$12	\$7,680	\$13,140	2,500	\$ 5.26
2. Private collectors	3,100	9.0	27,900	.08	2,230	125	1.5	12	2,250	4,480	2,255	1.99
C. City of Folsom												
1. Public collector	650	3.5	2,300	.13	\$ 280	26	2.0	\$ 8	\$ 420	\$ 700	50	\$14.00
D. Independent Disposal Area												
1. Private collector	780	5.0	3,900	.13	\$ 510	31	2.0	\$10	\$ 610	\$ 1,120	260	\$ 4.31
E. Camarillo Disposal Area												
1. Private collector	100	4.0	400	.15	\$ 65	4	2.0	\$10	\$ 80	\$ 145	12	\$12.08
F. Delta Refuse Area												
1. Private collector	65	3.5	230	.15	\$ 35	3	2.0	\$10	\$ 60	\$ 95	8	\$11.88

1 - Includes fringe benefits.

2 - Source: Gennis, Gray & Justice, Engineers.

3 - Source: Solid Waste Management Division.

Source: Bartle Wells

Refuse Collection. Collection costs were estimated as the exclusive costs of collecting refuse. The dividing line between haul and collection, while hazy in practice, was assumed to occur at the point where the collection route ends and the haul to the disposal site begins.

Table 5-17 shows weekly refuse collection, haul, and disposal costs. (The costs of street sweeping are not shown.) The sum of these three cost components is the total operating cost for refuse collection. Included in these costs are amortized capital costs as well as administration costs.

Public agency budgets provided the major cost information for residential collection. Estimates were provided by the financial consultant for capital and operating costs of one major private collector. All other collectors in Areas A and B provided their own best estimates of collection and haul costs.

Table 5-17 clearly points out a difference in costs between residential collection and commercial collection. In Areas A and B the costs of residential collection and disposal are about \$37.00 per ton while the costs of commercial collection and disposal are about \$14.00 per ton. This cost difference is not surprising considering the types of waste handled. Commercial collectors utilize bins, primarily, which allow for small crews and low mileage per collected ton. Residential house-to-house service, on the other hand, utilizes large crews and is hindered by high mileage per collected ton and numerous stops per route.

Street Sweeping. The major street sweeping in the County is conducted by the City of Sacramento Division of Street Sweeping (25% of city landfilled refuse is street sweeping). The division spends an average of \$41,200 per week, yielding an annual budget of about \$2,140,000 financed out of the general fund. This expenditure includes collection and haul costs for street sweeping but does not include disposal costs. Disposal costs for the Division of Street Sweeping are paid

TABLE 5-17

1975 COST OF COLLECTION AND DISPOSAL
FOR COLLECTED WASTE

	Collection \$/Week	Collection Cost \$/Ton	Haul \$/Week	Haul Cost \$/Ton	Disposal \$/Week	Disposal Charge \$/Ton	Total \$/Week	Weekly Tonnage	Total Cost \$/Ton
A. City of Sacramento									
1. Public collector ¹	\$65,430	\$31.16	\$10,770	\$ 5.13	\$ 2,520	\$1.20	\$ 78,720	2,100	\$37.49
2. Private collectors ²	11,530	5.57	11,510	5.56	5,560	2.69	28,600	2,070	13.82
Total or Average	\$76,960	\$18.46	\$22,280	\$ 5.34	\$ 8,080	\$1.84	\$107,320	4,170	\$25.74
B. North Area of County									
1. Public collector ¹	\$72,890	\$29.16	\$13,140	\$ 5.26	\$ 5,700	\$2.28	\$ 91,730	2,500	\$36.71
2. Private collectors ²	21,530	9.55	4,480	1.99	5,390	2.39	31,400	2,255	13.92
Total or Average	\$94,420	\$19.86	\$17,620	\$ 3.71	\$11,090	\$2.23	\$123,130	4,755	\$25.89
C. City of Folsom									
1. Public collector ¹	\$ 415	\$ 8.30	\$ 700	\$14.00	\$ 75	\$1.50	\$ 1,190	50	\$23.80
D. Independent Disposal Area									
1. Private collector ²	\$ 3,110	\$11.96	\$ 1,120	\$ 4.31	\$ 1,040	\$4.00	\$ 5,270	260	\$20.27
E. Camarillo Disposal Area									
1. Private collector ²	\$ 495	\$41.25	\$ 145	\$12.08	\$ 48	\$4.00	\$ 690	12	\$57.33
F. Delta Refuse Area									
1. Private collector ²	\$ 370	\$46.25	\$ 95	\$11.88	\$ 32	\$4.00	\$ 500	8	\$62.50

1 - Based on 1974/75 budget.

2 - Based on estimates of operating and capital costs.

Source: Bartle Wells

by the Division of Waste Removal as part of the costs of operating the city landfill. Thus, garbage collection service charges paid to the Division of Waste Removal finance the disposal costs for street sweepings.

Using the rate of \$1.20 per ton, the estimated cost of disposal at the city landfill, the Division of Street Sweeping incurs disposal costs of about \$2,000 per week to landfill about 1,700 tons of street sweepings per week. Thus, the Division's total cost of operation adds to about \$43,200 per week. This is equivalent to about \$25.41 per ton.

The total cost of street sweeping operations in the rest of the County is negligible. The cities of Folsom, Galt and Isleton operate street sweeping operations as part of their public works departments. The costs of these operations were not estimated.

Regulation. The County Public Works Department and the DCH are responsible for regulating the County's solid waste management system. Regulation has four parts:

1. Controlling litter (Public Health).
2. Enforcing operating standards (Public Works).
3. Regulating rates (Public Works).
4. Issuing permits (Public Works).

The current budget for the regulatory function performed by Public Works is \$31,000; for the DCH the figure is \$75,000 per year. The City of Sacramento and other cities in the County spend negligible amounts for regulation of solid waste activities.

Planning. The County's 1974-75 planning budget in solid waste management is approximately \$110,000. In addition, numerous agencies which are participating in the review of the Countywide plan will be making expenditures for planning.

COST SUMMARY

Table 5-18 summarizes the annual estimated cost of operating all systems, both public and private, in Sacramento County.

TABLE 5-18

1975 COST OF COLLECTION AND DISPOSAL

Refuse Collection and Disposal	\$/Year
Collection	\$ 9,140,000
Haul	2,182,000
<u>Disposal</u>	<u>1,059,000</u>
TOTAL	\$11,381,000
Street Sweeping	\$/Year
Collection and haul	\$ 2,140,000
<u>Disposal</u>	<u>104,000</u>
TOTAL	\$ 2,244,000
	\$/Year
Disposal of All Other Wastes	\$ 432,000
Regulation	\$ 106,000
Planning	\$ 110,000
Total Cost of Collection and Disposal System	\$14,273,000

Source: Bartle Wells

Chapter 6

Problems And The Need For Action

INTRODUCTION

This chapter identifies existing and potential problems within the County-wide solid waste management system. Alternative means of dealing with these problems will be discussed in subsequent chapters.

Problems may be viewed as deficiencies in the existing solid waste management system. A solid waste management procedure or operation is deficient if it is: a violation of law, dangerous, objectionable to the senses, inefficient, in conflict with existing goals and objectives, or difficult to administer or enforce. This planning effort called upon the entire community to identify problems and to assign priorities for action. Numerous workshop sessions were held with the Technical Review Committee and the Citizens Advisory Committee to unearth and evaluate system problems. In addition, all waste management system agencies were contacted and asked to identify their problems and needs.

Solid Waste Management problems are discussed as they relate to the following system components: generation, storage, collection, transfer, processing, disposal, special wastes, administration, and legislation.

WASTE GENERATION

The generation of waste involves two factors: 1) the policies, philosophies and consumer habits which form the basis of waste generation; and 2) the quantity, type and composition of waste that is generated. Many complex interacting factors are directly involved in waste generation such as product design, material policies, availability of resources, state of the economy, etc. While local government is not in a position to deal directly with these conditions, the problem should not be ignored at the local level.

A reduction in the generation of waste through a reduction in the consumption of materials or products is called source reduction. Examples of source reduction include reuse of products (e.g., the retreaded tire or refillable beverage container), the use of less material-intensive products (e.g., a smaller automobile or deletion of excess packaging), the improvement of product durability or extension of product lifetime, and the reduction of the number of products consumed.

Generation Problems

Problem - Quantities of waste by type, location and volume cannot be accurately predicted because of inadequate or nonexistent data.

Problem - Quantities of waste are increasing because of population growth.

Problem - Waste components which have value are generated and then disposed, often resulting in a significant loss of resource material and energy.

Resolution of Problems

Waste generation problems have a low priority in this plan because they are difficult, if not impossible, to deal with at the local level. However,

some efforts will be made in the near-term planning period to identify, characterize, and quantify waste generation problems. This might lead to some locally mandated actions such as more efficient internal recycling programs in residential, commercial and industrial enterprises.

On the other hand, waste generation problems have developed a high priority in terms of current state and national rhetoric. This plan encourages that rhetoric and suggests actions for participation. If, in fact, this rhetoric gives way to legislative and economic action, then we could anticipate a possible retreat from the "throw-away" ethic by the year 1980.

It is assumed that negligible changes will occur in waste generation practices through the year 1980. However, any significant reduction in the waste stream precipitated by state or national legislation should increase the cost per ton of handling waste while reducing the total cost.

WASTE STORAGE

The storage of waste is mainly concerned with facilities and containers used to accumulate and hold solid waste at the place of generation. Typical concerns are associated with the type, condition, location, and ownership of the waste storage containers.

Improper methods of storage produce problems such as litter, flies, rodents, and odors. Special problems involving home-owner separation of cans, bottles and other materials are considered to be solid waste storage problems.

Storage Problems

Problem - Existing local standards, by which storage conditions are measured, are inadequate.

Problem - Specific problems found by field inspection include:

- Inaccessible containers,
- Overflowing containers,
- Sunken containers.

Problem - For those agencies engaged in separate collection of recyclables, there are no uniform procedures for on-site storage of those materials.

Resolution of Problems

Storage is evaluated and remedies proposed in the recommended alternative through the near-term planning period. Initially, this will result in the adoption of state standards and the subsequent development and upgrading of local standards. The City of Sacramento currently has 2 building permit review procedures for its waste removal division in this regard.

Prevention of problems will be stressed through amendments to building codes and the development of solid waste management review of construction plans for critical areas (e.g., shopping centers, apartment complexes, etc.).

In the medium- to long-term planning period, significant changes are anticipated in storage and containerization technology. Thus, meaningful discussion in this area must be postponed for several years.

WASTE COLLECTION

Approximately 80% of the solid waste management dollar is consumed in the collection of solid waste. The reason for this high proportionate share of cost is due to the labor intensiveness of collection (approximately 60% of the collection dollar is expended on labor).

As discussed in Chapter Five, the collection functions in the County are performed by a blend of public and private organizations. This mix of the collection function is best understood if collection of solid waste is

viewed as being of two different types: residential and commercial. These two types of collection differ in the manner in which the solid waste is generated and stored. Residential waste is generated by citizens in their homes and stored in standard garbage cans; whereas commercial waste is generated by commercial activities such as stores and is stored in large bins. The type of container dictates the manpower and equipment which is required to perform the collection function.

The City of Sacramento does not permit private haulers to collect putrescible and infectious waste within the city limits. Putrescible and infectious waste are specially handled by the city.

County and city collection policies have evolved over many years of solid waste management activities and reflect political decisions made by appropriate political bodies. No readily definable operational problems are apparent in the existing collection system.

Collection Problems

Problem - Information on quantity and type of refuse collected by service area is incomplete.

Problem - There is no uniform means of assigning commercial collection permits.

Problem - Fragmented collection areas lead to inefficiencies.

Resolution of Problems

The various jurisdictions within the County will, in the near term, propose measures to guarantee efficient operation of public collection agencies. This may include mandated collection, upgraded standards for operation, experimentation with technological innovations, and rate control. The program alternatives of this plan contain a very limited discussion on collection since it is a local and solid waste collection responsibility.

For the medium- to long-term planning period, any change in collection practices will be dictated by the type of recovery system (front- and rear-end) that is developed. A comprehensive recovery system would require firm control over the county-wide waste stream to insure the availability of minimum needed quantities of waste over a long period of time.

The economic and agency impacts in the near term might be substantial. For the medium to long term, cost impacts will be significant as private industry collectors and all refuse collection customers might experience rate increases to offset the costs of resource recovery.

WASTE TRANSFER

Under certain conditions transfer stations can reduce the costs for transportation of refuse between a collection area and a processing or disposal facility. For example, if the processing or disposal point is a long distance from the collection area, then a large number of small collection vehicles traversing this route would be far more expensive to operate than a few large transfer vehicles. This is particularly true when the smaller collection vehicles have several collectors sitting idle during the trip.

Sacramento County's Department of Public Works conducted a detailed study of the need for transfer stations within the South Area of the County in 1973. The conditions within the North Area and the City of Sacramento required further study which was carried out during this solid waste management planning process. Appendix D discusses this analysis in detail.

Transfer Problems

Problem - The basic problem is to determine needs related to numbers, sizes, locations, and types of transfer stations which will effectively and efficiently serve the community.

Problem - The level of processing at each transfer station needs further study with culmination in appropriate alternatives.

Problem - Existing and proposed transfer stations should be modified to meet existing and future requirements. More information is needed.

Problem - There is much less information concerning the need for transfer stations in the North Area than in the South Area.

Resolution of Problems

In the near term it is likely that two or three additional transfer stations will be constructed (for a total of four or five County-wide). All problems related to the County-wide distribution of these transfer stations will be evaluated in the planning process and detailed in the alternatives of this plan.

Site selection problems will be looked into at a later time on a project-by-project basis.

For the medium and long term, there is no anticipated construction of transfer stations as those transfer stations constructed in the near term will handle County-wide waste through the year 2000.

WASTE PROCESSING

Solid waste processing includes size reduction, separation, baling, recovery, energy conversion and recycling of solid wastes. Typical processes include: incineration, composting, steam production, pyrolysis, milling, magnetic separation, etc. Processing in Sacramento County is presently limited to hand separation, magnetic separation, recovery, and recycling. Appendix G discusses the processing systems studied by staff during plan preparation.

Processing Problems

Problem - The State Solid Waste Management Board has established a goal that counties shall reduce the quantity of solid waste going into landfills by 25% by 1980. Any county not incorporating

resource recovery methods into its plan must demonstrate that none are feasible. Consequent problems are:

- need to determine which materials should be removed and what priority should be assigned to each material to be removed,
- need to determine what major problems are involved in waste reduction and which methods will work best in Sacramento County, and
- need of a mechanism for influencing and stabilizing the markets to assure the success of a recovery program.

Problem - Problems associated with the choice of recovery are:

- the State does not provide any direction in the choice of systems which range from energy recovery to material recovery,
- information on recovery systems is incomplete and/or non-existent, and
- technology is too new to be assessed in terms of long-term effectiveness and efficiency.

Problem - Problems in financing a recovery system are:

- economics of recovery systems are either questionable or unknown, and
- sources of financing for this type of project have not been clearly established.

Resolution of Problems

In the near terms, recovery activities will include hand salvaging of cardboard and metals, magnetic separation at disposal sites, and paper recycling. Consolidated processing (milling), separation, and marketing is evaluated in depth in Chapter Nine.

The near term cost impact of developing consolidated processing capability is significant with unit cost levels of five to ten dollars per ton for maintenance and operation. Major agency impact will be the need for regulatory, operational, and administrative control of the overall transfer-

processing-disposal system.

After 1980 there is the possibility of adding a rear-end energy recovery unit to the system. The cost impacts of such a move are very substantial. The agency impact could be less significant as that agency responsible for the front-end system could handle development and implementation.

WASTE DISPOSAL

Within Sacramento County, all current disposal of solid waste is by land disposal and the need for land disposal will be with us for the foreseeable future. Resource recovery or energy recovery systems might lessen the need for land disposal but all current technologies have residue which must go to landfills.

Problems of disposal within Sacramento County are discussed as they related to general problems (those problems common to all disposal sites in the County), and specific problems (those problems peculiar to individual sites in the County).

Disposal Problems Common to All Disposal Sites

Problem - Effects of landfill disposal sites on the public and community include:

- Sites are considered by local residents as a blight on their community. Improper or negligent operation results in unsightliness, odor, litter, smoke, vermin infestation, and fly and insect breeding grounds.
- Residential property values generally decrease in areas surrounding disposal sites.
- Trucks and autos traveling to and from disposal sites create traffic congestions and noise in surrounding communities and impair air quality.
- Locations favorable to the community for landfill disposal sites are generally too remote or less desirable for the collection industry.

- Lands otherwise suitable for urban or agriculture uses are taken for landfill sites.
- Long distance hauls increase disposal costs, reduce utilization of collection vehicles and crews, and add to collection cost.
- Utilization of disposal sites by the public at large creates operational problems.

Problem - Effects of solid waste disposal on water quality:

- Lack of Water Quality Impairment Studies and Ratings of disposal sites. However, the City of Sacramento has recently completed a water quality study at their landfill.
- Inadequate information regarding the formation and flow of leachate into surface waters and the ground water body at existing landfills and abandoned sites within the County.
- Location of disposal sites adjacent to water courses such as rivers, streams and creeks, natural drainage courses and water sheds and lands with high ground water table or subject to flooding and which may cause problems.
- Control over dumping of garbage, toxic, and hazardous waste at Class III disposal sites and dumping of Group 1 wastes into something other than a Class I facility.

Problem - Administration and operation of disposal sites:

- The lack of uniformity of existing user fees between sites disturbs the public.
- Existing disposal records are inadequate regarding: type and quantities of waste (volume or weight); traffic counts (vehicle type and number); and source (municipal, commercial, industrial, military, special, public, and other).
- Uncontrolled salvage operations at some existing sites leads to lack of information regarding: type of quantities, source, storage, and records.
- Handling difficulties associated with the disposal of special waste.
- Engineering data specific to each disposal site missing and incomplete.

- Conflict between operating hours required to "meet the needs of the refuse hauler and general public" and the hours required to "insure proper and efficient disposal operations."
- Security of facilities and equipment against vandalism and theft during hours of closure.
- Lack of planned use for exhausted fills.
- Inadequate contingency plans for acquisition of future disposal sites.
- No policy guidance.

Problem - Inadequate information regarding the need for a Class I hazardous waste site.

Problem - Lack of information regarding methane gas generation.

Problem - Locating and acquiring new landfill sites in advance of need.

Problem - Financing new disposal sites.

Disposal Problems Applicable to Specific Sacramento County Sites

Problem - A number of disposal sites have short life expectancy:

- Grand Island Disposal Site (Isleton)--estimated year of closure is 1976.
- Elk Grove (Waterman Road) Site will be exhausted within three years--estimated year of closure is 1979.
- Waldon's Disposal Site (14th Avenue) will be exhausted within one year--estimated year of closure is 1976.
- Davis Pit (Florin-Perkins Road and Jackson Road) operation as an unlicensed dump; data very sketchy on use; unsupervised dump; capacity and remaining life unknown.
- City of Sacramento Landfill (Downtown)--estimated year of closure is after 1980.
- Sacramento County Landfill (Kiefer Blvd.)--must provide County-wide disposal of solid waste as existing sites become exhausted--estimated year of closure is 2000.

- Rio Vista (Solano County)--landfill receives some refuse from Sacramento County. Data from this site on Sacramento County waste is limited--estimated year of closure is 1994.
- Yolo County Regional Landfill--first opened in July, 1975. This 220-acre landfill should last through the remainder of this century.

Resolution of Problems

Sacramento County will solve most landfill operational problems through attrition. That is, all sites in the County, including the City landfill, will be closed by 1982, leaving only the County disposal site in operation.

The single disposal site concept will be facilitated by the distribution of strategically located transfer stations throughout the County.

A new Class III disposal site will most likely be constructed prior to 1980. The need for a Class I waste disposal site will be fully explored. This planning study does not provide the details of Class I or Class III site planning. As the County site will be the only landfill to survive the near term, action will be taken to upgrade this site in terms of water quality and other environmental considerations. Land adjacent to the County landfill may be acquired to extend the landfill life well into the 21st century.

It is anticipated that disposal operations will be stabilized by 1980 and no foreseen actions are anticipated in the medium and long term.

SPECIAL WASTES

Special wastes are those wastes which require special handling within the solid waste system. Those special wastes causing problems in Sacramento County include: tires, construction and demolition wastes, infectious wastes, hazardous wastes, and litter.

The particular problems associated with each category are discussed as follows:

Tire Problem

Automobile and truck tires cause a unique set of problems within the existing solid waste management system.

Problem - Whole tires are difficult to incorporate into a landfill because they cannot be compacted and therefore cause significant voids within the fill. Subsequent shifting of material into those voids can cause excessive settlement of the landfill. The voids within the tire and the tire shape create a buoyancy effect which causes buried tires to work their way upwards in the landfill and ultimately to become exposed on the surface.

Problem - Within the planning area, the County landfill is the only major disposal facility which will accept whole tires. In the past, a disposal fee of \$5.00 per ton was imposed on all loads of whole tires. However, rates in surrounding areas of the state range from \$25 to \$50 per ton for tire disposal. The \$5.00 per ton rate was attracting tires from as far away as Seattle and Salt Lake City. Because of this and the high operating costs for handling tires, the Board of Supervisors increased the rate for tire disposal at the County landfill to the present level of \$20 per ton. Because of the high disposal fee and lack of close-in facilities, there exists a significant problem in regards to illegal dumping along roadsides and in unimproved areas. There is no system for policing, monitoring, or controlling tire collection and disposal operations within the County. Recent attempts by private industry to install and operate tire processing facilities which incorporate shredding have met with business failure within Sacramento County.

Construction and Demolition Wastes

These wastes result from normal construction activities and are composed of wood, concrete, building materials, and earth from excavation.

Problem - The major portion of demolition wastes are now disposed in the 14th Avenue landfill. When this landfill becomes exhausted in the next year, there will be no suitable alternative for disposal.

Problem - There are no established criteria which could be used to evaluate new demolition waste sites as applications are submitted.

Hazardous Wastes

The State Solid Waste Management Board has defined hazardous wastes as follows:

Hazardous Wastes - include any waste material or mixture of wastes which is toxic, corrosive, flammable, an irritant, a strong sensitizer, which generates pressure through decomposition heat, or other means, if such a waste or mixture may cause substantial personal injury, serious illness or harm to humans, domestic animals, or wildlife, during, or as an approximate result of any disposal of such wastes or mixture of wastes as defined in Article 2, Chapter 6.5 Section 25117 of the Health and Safety Code. The terms "toxic," "corrosive," "flammable," "irritant," and "strong sensitizer" shall be given the same meaning as in the California Hazardous Substances Act (Chapter 13 commencing with Section 28740 of Division 21 of the Health and Safety Code.)

These kinds of wastes generally are produced by industrial processes. Sacramento County has a notable lack of industry, thus, problems pertaining to hazardous wastes are not as severe as might exist in other counties. Nevertheless, the situation must be addressed.

The State Water Resources Control Board defines Group 1, Group 2, and Group 3 wastes as follows:

Group 1 Wastes - Consist of or contain toxic substances and substances which could significantly impair the quality of usable waters. "Toxic" means lethal, injurious, or damaging to man or other living organisms including plants, domestic animals, fish, and wildlife.

Group 2 Wastes - Consist of or contain chemically or biologically decomposable materials which do not include toxic substances nor those capable of significantly impairing the quality of usable waters.

Group 3 Wastes - Consist entirely of non-water soluble, non-decomposable inert solids.

These definitions become important when alternative means of handling Group 1 wastes are being considered. Group 1 wastes can only be disposed of in a Class I disposal site.

Class I disposal sites are those at which complete protection is provided for all time for the quality of ground and surface waters from all wastes deposited therein and against hazard to public health and wildlife resources.

Class II disposal sites are those at which protection is provided to water quality from Group 2 and Group 3 wastes.

Class III disposal sites are those where water quality would not be protected from the effects of Group 1 and Group 2 wastes.

During 1970 and 1971, the Department of Public Works conducted a detailed study into the need for a Class I disposal site. At the time, it was found that many pesticide containers were being generated throughout the County with no adequate or acceptable means of disposal. Thus, a Class I disposal facility was recommended.

Pesticides and their containers are defined to be Group 1 wastes; however, in 1972 the State Water Resources Control Board defined "adequately cleansed pesticide containers" to be a Group 2 waste. The term "adequately cleansed" is rigidly defined and involves a specific procedure of rinsing the used containers.

This new definition of pesticide containers allows disposal of pesticide containers at the Sacramento County landfill. Because of this, the need for a Class I disposal site has been greatly diminished.

The State Central Valley Regional Water Quality Control Board and the State Health Department, Bureau of Vector Control receive information forms from Class I disposal site operators. The form contains name of waste generator, location of waste generation, type of waste, collector of waste, and name of disposal facility. Thus, the State currently has on file information forms which detail type of hazardous waste and the county of origin. The State Health Department is currently preparing

a computer program to reduce this information so that it can be of benefit to county and state planners.

Sacramento County currently has very little information regarding the origin and disposition of hazardous wastes. The State computer print-out will be a major asset in the County's attempt to develop a hazardous waste permitting and monitoring program.

Problem - The major problem of hazardous waste is a lack of inventory concerning types and quantities that are generated. The generator of these wastes is responsible by State law for proper disposal but may not be aware that the waste generated is hazardous, or may not be sensitive to the need for special handling of these wastes.

Problem - There is no system for monitoring and controlling the generation, movement and disposal of hazardous waste in the County.

Problem - The final decision as to the need for a Class I disposal site or transfer station has not yet been made.

Infectious Wastes

There are eight acute and 40 convalescent hospitals in Sacramento County. All of these facilities are currently permitted by the DCH and dispose of their infectious wastes under prescribed conditions: four acute and six convalescent hospitals incinerate; four acute hospitals utilize compactor bins; six convalescent hospitals sterilize (autoclave); 28 convalescent hospitals have isolated storage.

All of the above techniques, except those involving incineration, require that the intact waste be sent to a landfill. Residue from incineration is also landfilled.

The major problems in the control of infectious or potentially infectious wastes are as follows:

Problem - Regulation and control.

- Veterinary hospitals, doctor's offices, clinics, medical labs, and other paramedical facilities are not currently regulated.
- Surveillance of facilities, collectors, and disposal sites is minimal.
- In some cases potentially hazardous waste is mixed with nonhazardous waste and not treated as hazardous material.

Problem - Facility requirements.

- Handling of sharps (needles) is not regulated.
- Transfer of infectious waste from one facility to another having an incinerator is not well defined.

Problem - General.

- Adequate information is not available for assessing the impacts of nonregulated activities on the community.
- The division of labor between the State Health Department and the DCH for inspection of acute and convalescent hospitals obscures responsibility for addressing problems related to these facilities.

Litter

The division of labor in responding to litter problems is too great for the development of a centralized litter control activity. Unfortunately, there is not much that can be done about some aspects of this problem as local governments are not likely to budget funds to control litter on Federal and State highways and parks, etc. The City of Sacramento has an ongoing neighborhood cleanup and vehicle abatement program.

The discussion of litter control (Chapter Five) demonstrates that there are not adequate funds and manpower allocated to litter control activities in the County and existing resources could be better organized and more efficiently handled.

Problem - The current litter control activities are passive in that they respond to citizen complaints. There is no active effort to discourage or prevent littering except that which is incidental to weed abatement programs and specific actions taken against flagrant violators of local litter regulations.

Problem - There have been millions of dollars spent on education and enforcement programs for litter control. The effect of this has been very disappointing. Where dollars have been allocated for the purpose of cleaning up the litter the result has been encouraging. The current state guidelines for litter control seem to ignore these facts.

Waste Water Treatment Plant Sludges

Problem - The quantity of sewage sludge to be disposed of in the future will increase significantly. The trend in the County is toward consolidation of the many local plants into one large regional plant.

Problem - The upgrading of existing plants to secondary and tertiary treatment nearly doubles the sludge quantity with each successive stage of treatment. Even rural plants are finding it more difficult to dispose of sludge on land because of odor problems and social attitudes of people occupying neighboring farmlands.

Problem - Land application may not be viable as a sludge utilization technique. Evaluation will be completed by the Sacramento County Regional Sanitation District within five years.

Resolution of Problems

All special waste problems will be addressed in the near-term planning period. The following actions will evolve from the plan either as an action program or as a recommendation for future programs.

- o Special waste control will be assigned to an agency.*
- o Each special waste will be characterized as to quantities, control, disposal and recycling options.*
- o Policies will be adopted.*
- o Programs will be developed and implemented.*

The cost and agency impacts of these activities are impossible to assess as information relative to special waste is lacking and specific programs have yet to be defined.

ADMINISTRATION AND CONTROL

There are two administrative processes in the current Sacramento County solid waste management system: administration of each component (such as a collection service) and overall administration of all components in system (collection, transfer, etc.). This plan does not deal with internal administration of the various service companies in the system, but rather is restricted to problems of administration and control of the interfacing and overlapping service companies.

In Sacramento County there are nine public jurisdictions involved in the processes of policy determination and regulation, 24 companies providing collection service (private and public), five street cleaning services, two transfer stations, five disposal sites, a number of recovery operations, and five agencies involved in litter control activity.

Beyond the regulation of the various components of the solid waste system in Sacramento County there is the need for system-wide administration. That is, private industry and local government must work together to provide adequate solid waste service, keep the citizenry satisfied, and fulfill State mandates. To accomplish this, coordination and planning at the broadest County level are required.

All problems related to administration and control stem from three factors: the State has mandated a recovery effort in the plan; the State has mandated that the administration and implementation of the plan be feasible; and planning and control of County-wide solid wastes activities should be as effective and efficient as is practical.

Administrative and Control Problems

Problem - There are nine jurisdictions setting policy regarding planning for and regulation of the current multivarious solid waste activities.

Problem - There is no current method for soliciting citizen and technical input for policy decision making and planning activities.

Problem - There is no means at hand for reviewing, coordinating, and distributing solid waste information and answering citizen inquiries regarding solid waste activities.

Problem - There are insufficient mechanisms, such as "permitting activities," to assure that record keeping is adequately comprehensive in scope and detail to maximize the effectiveness of future planning and program efforts.

Problem - There is no coordinated means at hand to insure the development and implementation of effective solid wastes services and regulatory activities.

Problem - The large number of jurisdictions and service companies make for complex and unwieldy administration and control which serve to defeat planning activities and discourage private industry from playing a more innovative role in the solid waste management system.

Resolution of Problems

In the near term, all administrative, regulatory, and financing responsibilities will be assigned to local agencies. A central agency could emerge to oversee transfer, processing, and disposal activities on a County-wide basis.

This plan will recommend candidate administrative forms and financing mechanisms capable of dealing effectively with anticipated problems. The cost and agency impacts of these probable changes in the system could be substantial.

After 1980 there are no anticipated changes in the system which would have significant administrative impacts, assuming that the recommended administrative form will have the capability of managing a rear-end system, should such a system be adopted in the future.

LEGISLATION

Federal and State legislation provides adequate standards and guidance for local jurisdictions to squarely address the major issues related to solid waste management. However, in the area of financing, Federal

and State Government could do much more to encourage private and public innovation in solid waste management. Additionally, Federal and State Government have been deficient in addressing major problem areas in solid waste management which have regional, state-wide, and national impact. Examples are the need for source reduction legislation, revised policies regarding secondary materials, freight rates, and legislation to stabilize the value of recovered materials.

Local ordinances reflect the policies of the Board of Supervisors and the various city councils. By and large, they address operational and administrative issues; only so far as they require users fees and set rates do they effect the financibility of a solid waste system.

The demands by the Federal and State Governments for increased material and energy recovery efforts have virtually rendered small municipalities incapable of managing recovery systems. Thus, the decision has been made to initially allow the counties to take on the task of managing resource recovery programs, with some thought of regional activity in the future. Therefore, the cities and the County should coordinate in the development of a common ordinance philosophy to facilitate the operation and control of the County-wide solid waste management activities.

Legislation Problems

Problem - Inadequate measures have been instituted to insure the financial feasibility of large recovery systems.

Problem- Source reduction has not been seriously dealt with as a means for solving waste generation problems.

Problem - Price stabilization of secondary materials appears to be necessary for effective recovery programs. This possibility has not yet been taken seriously.

Problem - The penalizing rail rates on secondary materials discourage the use of these materials and thus further increase the difficulties of producing resource recovery materials on a competitive basis.

Resolution of Problems

Federal and State legislators will be left to their own devices with the exception of appropriate local endorsements.

In the near term, the County ordinance will undergo major changes. It will be reorganized and updated, state standards will be added, and local standards will be revised and expanded.

Chapter 7

Facilities & Administrative Alternatives

INTRODUCTION

The preceding chapters of this plan have dealt with background information regarding the solid waste management system within Sacramento County. This chapter deals with various alternative solid waste management programs, their development, and general descriptions. It is from these alternatives that a specific action program can be selected for implementation.

The alternatives were developed from State mandates and goals, objectives, and priorities which were formulated through a joint effort of the Citizen Advisory Committee, the Technical Review Committee, and the planning staff. The staff represented the views of citizens as expressed at public and private meetings, as well as the views of the Board of Supervisors and the City Councils as expressed at official hearings and unofficial meetings.

In developing the alternative programs which would provide solutions to community problems there is always the difficulty of deciding how many alternatives should be presented and in what form they should be presented. The intent here is that those few alternatives selected for presentation be representative of a wide range of planning possibilities and that they reflect to various degrees the desire of the community, while contrasting the cost/benefits of low capital alternatives with more costly and ambitious alternatives. Finally, the alternatives must rationalize community needs against its ability and inclination to pay.

The goals, objectives, mandates, and priorities which provided guidance and set constraints on the development of alternatives are presented in the following section. The details of each alternative are presented in later sections.

GOALS, OBJECTIVES, MANDATES AND PRIORITIES

Goals

Sacramento County's solid waste management program must provide systematic and economical control of the storage, collection, transportation, separation, processing, recycling, recovery and disposal of solid waste on a Countywide basis, in a manner that provides maximum protection of the environment.

General Objectives

- o Eliminate health and safety hazards.*
- o Reduce and progressively eliminate environmental degradation caused by solid waste -- from generation to disposal.*
- o Minimize service costs compatible with the goals.*
- o Coordinate solid waste management with land use planning and with overall environmental improvement programs, including air, water, and land quality management.*
- o Practice resource recovery to the maximum degree economically feasible.*

Specific Objectives

- o Establish and maintain an equitable and efficient program of solid waste management on a Countywide basis.*
- o Organize operations required to manage, administer, and enforce existing and new legislation, and carry out necessary physical operations.*
- o Provide required capital and operations financing.*
- o Establish and maintain an equitable system of long-range financial support for the solid waste management program.*
- o Undertake rapid implementation of the expanded and improved solid waste management system.*
- o Institute resource recovery at the earliest possible time.*
- o Reduce the total number of land disposal sites.*
- o Minimize the environmental impact of land disposal sites by adhering to the highest possible operations standards.*

State Goal

The Solid Waste Management Board has established a statewide goal that the quantity of waste entering landfills by the year 1980 must be reduced by 25%. This goal has been interpreted to mean that all counties must show in their management plans how they will develop resource recovery capability to assist in reaching this goal. A key consideration for implementation is the financial feasibility of resource recovery. Additionally, the State has established numerous guidelines regarding plan administration, plan feasibility, plan implementation, and community coordination.

Priorities

Because of the large number of system problems to be solved, an order of priorities was established. The alternatives allocate community resources based on this order. The priorities are presented in descending order from highest to lowest and each contains a summary statement of justification for its position.

- o *The highest priority was given to the development of significant levels of resource recovery because of State mandates and citizen demands.*
- o *The development of adequate and appropriate disposal because of the imminent closing of all County landfills except the Kiefer landfill.*
- o *The development of transfer stations because (1) Countywide resource recovery would require a means of directing all waste into a consolidated processing station; and (2) analysis of Countywide waste generation areas and landfill costs suggests that transfer stations offer economic benefits.*
- o *The development of systems for handling special wastes because of State mandates concerning litter and hazardous wastes, and because of serious local deficiencies in data and programs related to those wastes.*
- o *The development of criteria and systems for the storage of waste to conform to proposed State standards.*
- o *A low priority was given to the development of different systems for the collection of waste because the existing collection system is functioning well, and State and citizen concern are absent.*
- o *The lowest priority was given to the development of systems for reduction of waste at the source because of the frustration of accomplishing anything in this regard at the local level.*

The previous chapters of this plan have explored issues regarding the existing system. The major issue to emerge was resource recovery. The resolution of that issue resulted in resource recovery receiving top priority in the planning process.

PROGRAMS COMMON TO ALL ALTERNATIVES

CAC BASIC RESOURCE RECOVERY PROGRAM. The Citizen Advisory Committee (CAC) developed and approved a policy of expanding home separation and collection of recyclables (see Appendix N). The basic intent of this CAC policy is to assign responsibility for recycling in the short term to the individual citizen. The CAC supports major recycling but questions the financial impact of those programs on the taxpayer. The CAC basic resource recovery policy is as follows:

This program is composed of several parts and places the major responsibility for system operation on the individual homeowner with major emphasis on home composting and home separation of recyclables. The program is defined in terms of the potential materials that are likely to be separated.

The CAC is aware that some or all of its recommendations for the resource recovery program may involve increase in costs to homeowners of varying amounts. The CAC gives priority to those recovery programs that can be implemented at the least cost.

1. **NEWSPAPER.** In those areas where home pick-up of separated materials is not available it is recommended that citizens separate, store and deliver separated newspaper to a transfer station. The transfer stations are to be equipped with bins for receiving the material. Also, a study should be conducted to determine if other local areas such as supermarkets, schools, etc., should also be similarly equipped.

2. **MIXED METALS (FERROUS AND ALUMINUM).** Home separation of mixed metals is to be encouraged on a voluntary basis. Agencies now responsible for refuse collection will, in addition to planning for separate collection of newspaper, begin studying the effects of separately collecting mixed metals and implement when feasible. Transfer stations will be equipped to receive and store mixed metals delivered by citizens. Local areas will be studied, such as supermarkets, schools, etc., to determine if they should be similarly equipped.

3. **GLASS.** Homeowners are encouraged to separate glass and transfer stations should be equipped to receive separated materials delivered by citizens. Local areas, such as supermarkets, etc., should be studied to determine if they should be similarly equipped.

4. **COMPOST.** Separation and composting of yard waste in the household is encouraged on a voluntary basis. Home pick-up of yard waste for use is also recommended. Outlet sources to be investigated for use of compost or shredded organic materials derived from home collection and community composting are:

- a. City and County parks;
- b. Freeway easements;
- c. Community gardens;
- d. Homeowners yard; or
- e. Vacant lots (at request of owner).

5. **PROCESSING AT TRANSFER STATIONS.** It is recommended that selected wastes at transfer stations should be separated either by hand or mechanically, whichever is most economical.

6. *ECONOMIC INCENTIVES. Economic incentives should be applied to those homes engaged in home separation of recyclables (i.e. lower waste collection rates or cash receivable for materials delivered).*

COUNTY WIDE PROGRAMS

There are certain programs that must be studied or phased into existence over the next several years. These programs will be recommended in this plan regardless of which alternative is recommended. Some of these programs are required by State mandate, others are required to upgrade the system or to provide information not now available. A summary of the cost and estimated time for completing the projects is shown in Plate 7-1.

CITY OF SACRAMENTO DISPOSAL PROBLEM. The City of Sacramento landfill will become exhausted during 1982, and this will have a major effect on existing operations. Five alternative courses of action are available to the city:

1. Develop a new landfill;
2. Use existing landfills (County landfill or Yolo regional) by direct haul;
3. Use existing transfer stations (County North Area and South Area Transfer Stations);
4. Develop a new transfer station to serve only the city; and
5. Develop resource recovery facilities sufficient to handle all of the city's waste.

Selecting a specific course of action will require an indepth engineering study. This study is provided for under Countywide programs. Even though a detailed study is required, it is possible to provide the following preliminary analysis of each alternative:

Alternative One. Development of a new disposal site would solve the city disposal problem. A cursory look at potential sites (50 acres or larger) reveals that no sites within a haul distance of 15 miles from the city landfill are satisfactory.

PLATE 7-1

COUNTYWIDE PROGRAMS

COST	TIME	STUDY DESCRIPTION
<u>Resource Recovery</u>		
\$ 75,000	1 year	Basic Resource Recovery Programs.
\$ 20,000 per year	Ongoing	Develop materials use and reuse policy for Sacramento County.
\$200,000	1 year	Implement full-scale resource recovery study program.
\$ 5,000	1 year	Develop and implement ongoing waste inventory system Countywide.
\$ 25,000		City Disposal Problem.
\$ 30,000	1 year	Land disposal studies. 1. Establish overall disposal site policy. 2. Develop gas and leachate monitoring system at landfills. 3. Develop ultimate land use policy at completed landfills. 4. Phase out unneeded or exhausted landfills. 5. Class III disposal site study.
<u>Collection</u>		
\$ 20,000	6 months	Trial program to determine effects of separate collection of recyclables.
\$ 10,000	6 months	Analysis of collection systems.
<u>Special Wastes</u>		
\$ 10,000	6 months	Develop hazardous waste inventory and control program.
		Develop litter control program.
\$ 10,000	6 months	Study tire disposal problem.

Alternative Two. Use of existing landfills (or development of new landfill with a 15 mile one-way haul) by direct haul is detailed in major program alternative 1A.

Alternative Three. Use of existing transfer stations might be practical, but will require modification of the current collection haul patterns for the City of Sacramento. Also, expansion of existing transfer stations to handle the increased waste load will require a capital investment. The cost of this course of action is assumed to lie between the cost of Alternative Two and Alternative Four.

Alternative Four. Constructing a new transfer station to serve only the City of Sacramento is detailed in major program Alternative 1B.

Alternative Five. Development of resource recovery facilities capable of receiving all city waste is discussed in major program Alternatives 2A, 2B, and 2C.

A summary of key features of each alternative is presented in Plate 7-2.

DESCRIPTION OF ALTERNATIVES

Resource recovery, land disposal problems and solid waste transfer systems represented the major area of concern in the development of alternative programs. Systems associated with the generation, storage and collection of waste are planned to remain relatively unchanged through the year 1980.

Two major concepts have emerged for study during this planning process. The first concept proposes only limited changes to the existing system. The second concept proposes major changes in regards to resource recovery. Two complete alternatives were developed around the first concept and are called the Group 1 alternatives. Three alternatives were developed around the second concept, called the Group 2 alternatives.

The Group 1 alternatives would maintain the existing system with its existing levels of resource recovery and would put off major system

ALTERNATIVE	1A	1B	2A	2B	2C
BASIC TRANSFER SYSTEM	+	+	+	+	+
CITY OF SACRAMENTO TRANSFER STATION		+			
NORTHEAST TRANSFER STATION			+	+	+
CONSOLIDATED MILLING FACILITY			+	+	+
MAGNETIC SEPARATION			+	+	+
AIR CLASSIFICATION WITH GLASS AND ALUMINUM RECOVERY				+	+
CLOSE COUNTY LANDFILL TO UNPROCESSED WASTE				+	+
REAR END SYSTEM					+

PLATE 7-2
COMPONENTS OF ALTERNATIVES

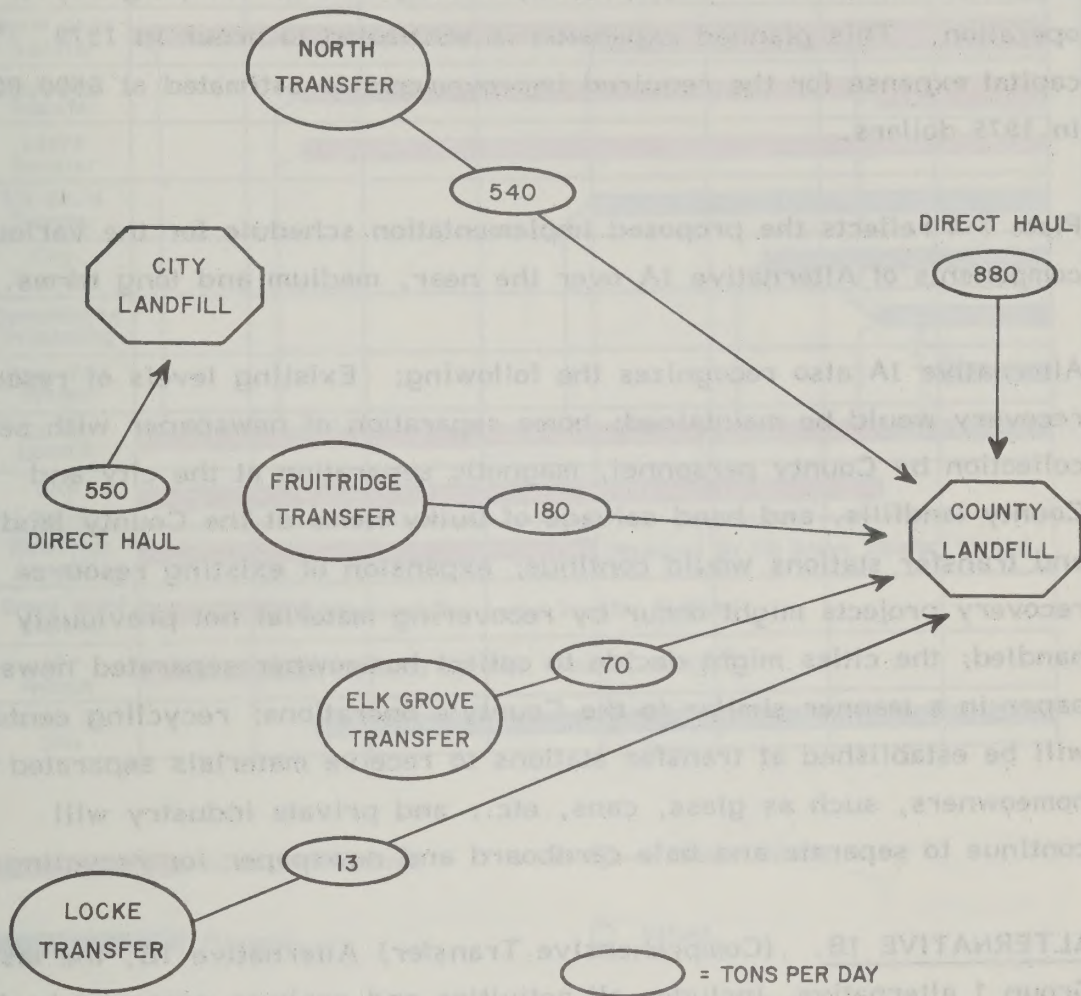
changes through the medium- or long-term planning period. The Group 2 alternatives would significantly change the existing system and begin the process of implementing major recovery in the short term (before 1980).

ALTERNATIVE 1A. (Limited Transfer) Alternative 1A is a Group 1 alternative, which is substantially a continuation of the existing system. It is mainly motivated by a desire not to lose ground in the County's progress toward efficient and effective solid waste management. The major appeal of this alternative is that it will have a low cost impact. See Plate 7-3 for a graphic display of Alternative 1A.

In Alternative 1A, the city disposal problem is assumed to be solved by direct haul to a remote landfill. This course of action produces the greatest amount of disruption to the city's existing collection system.

An Elk Grove Area Transfer Station is the only new facility proposed in this Alternative. The motivation for this transfer station is the imminent closing of the Elk Grove disposal site. A transfer station study has demonstrated that the Elk Grove Transfer Station is warranted because of the excessive haul distances from the Elk Grove area to the closest alternate disposal sites and because of the costs associated with establishing a new landfill (see Appendix D).

Additionally, Alternative 1A proposes the expansion of the existing North Area Transfer Station, which is described in Chapter 5 in detail. Current operational practices show that this facility is used beyond its design capacity with increasing frequency. The quantity of waste that is delivered for disposal has increased from less than 250 tons per day on peak days to over 400 tons per day. The general public has increased its usage of this facility because of greater familiarity and advertising. The commercial sector has shown a surprising increase in usage since the time the facility opened.



This plate shows the relative position of transfer stations and disposal sites in the county and the 1980 waste movement between facilities under alternative IA.

PLATE 7-3
ALTERNATIVE IA-1980 WASTE MOVEMENT

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

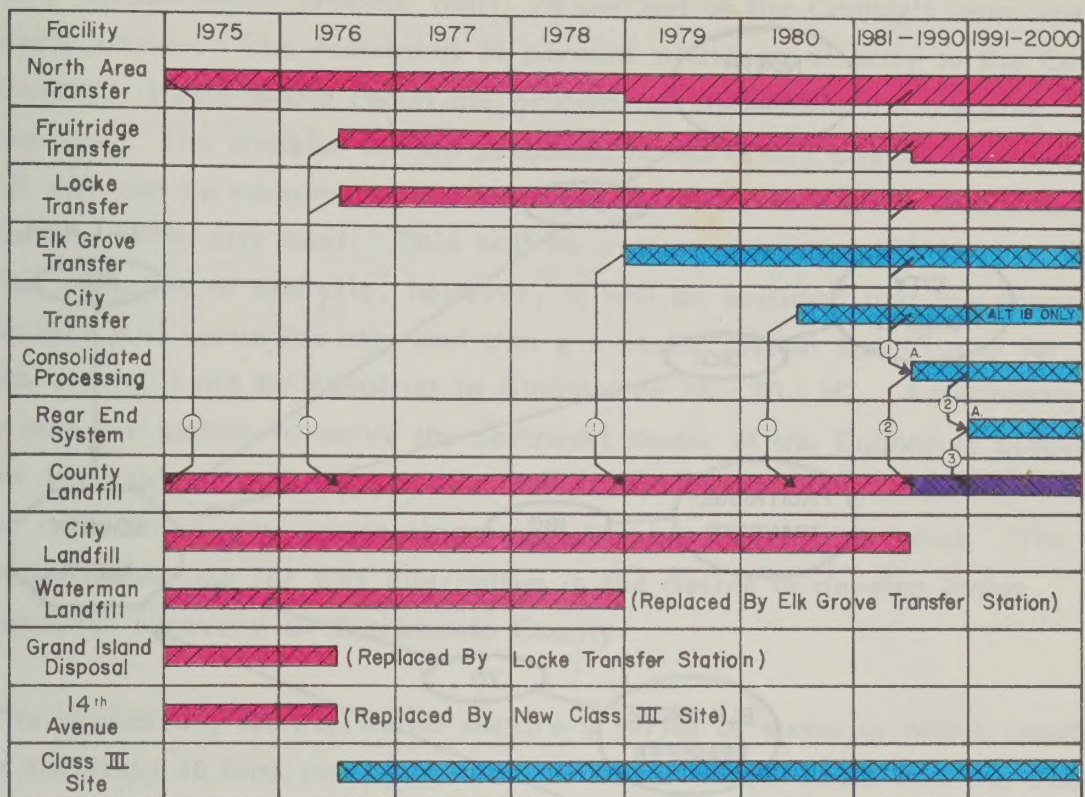
The steady increase of waste disposed at the North Area Transfer Station requires that this facility be expanded in operational capability. This expansion would be accomplished by adding another dumping bay to the operation. This planned expansion is scheduled to occur in 1979. The capital expense for the required improvements is estimated at \$500,000 in 1975 dollars.

Plate 7-4 reflects the proposed implementation schedule for the various components of Alternative 1A over the near, medium and long terms.

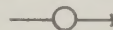
Alternative 1A also recognizes the following: Existing levels of resource recovery would be maintained; home separation of newspaper with separate collection by County personnel, magnetic separation at the city and County landfills, and hand salvage of bulky items at the County landfill and transfer stations would continue; expansion of existing resource recovery projects might occur by recovering material not previously handled; the cities might decide to collect homeowner-separated newspaper in a manner similar to the County's operations; recycling centers will be established at transfer stations to receive materials separated by homeowners, such as glass, cans, etc.; and private industry will continue to separate and bale cardboard and newspaper for recycling.

ALTERNATIVE 1B. (Comprehensive Transfer) Alternative 1B, the last Group 1 alternative, includes all activities and projects proposed in Alternative 1A. Additionally, Alternative 1B proposes building a transfer station to serve the City of Sacramento as a replacement to the city landfill planned to be closed in 1982. The major motivation for this alternative is the desire to provide convenient and economical disposal for the general public and to pave the way for future resource recovery activities. See Plate 7-5 for a graphic display of Alternative 1B.

ALTERNATIVE 2A. (Limited Materials Recovery) Alternative 2A, the first of the Group 2 alternatives, includes all activities and projects proposed in Alternative 1A. Additionally, Alternative 2A proposes a



Existing or Approved



Waste Transfer



Proposed

① Refuse



Expansion

② Processed Refuse



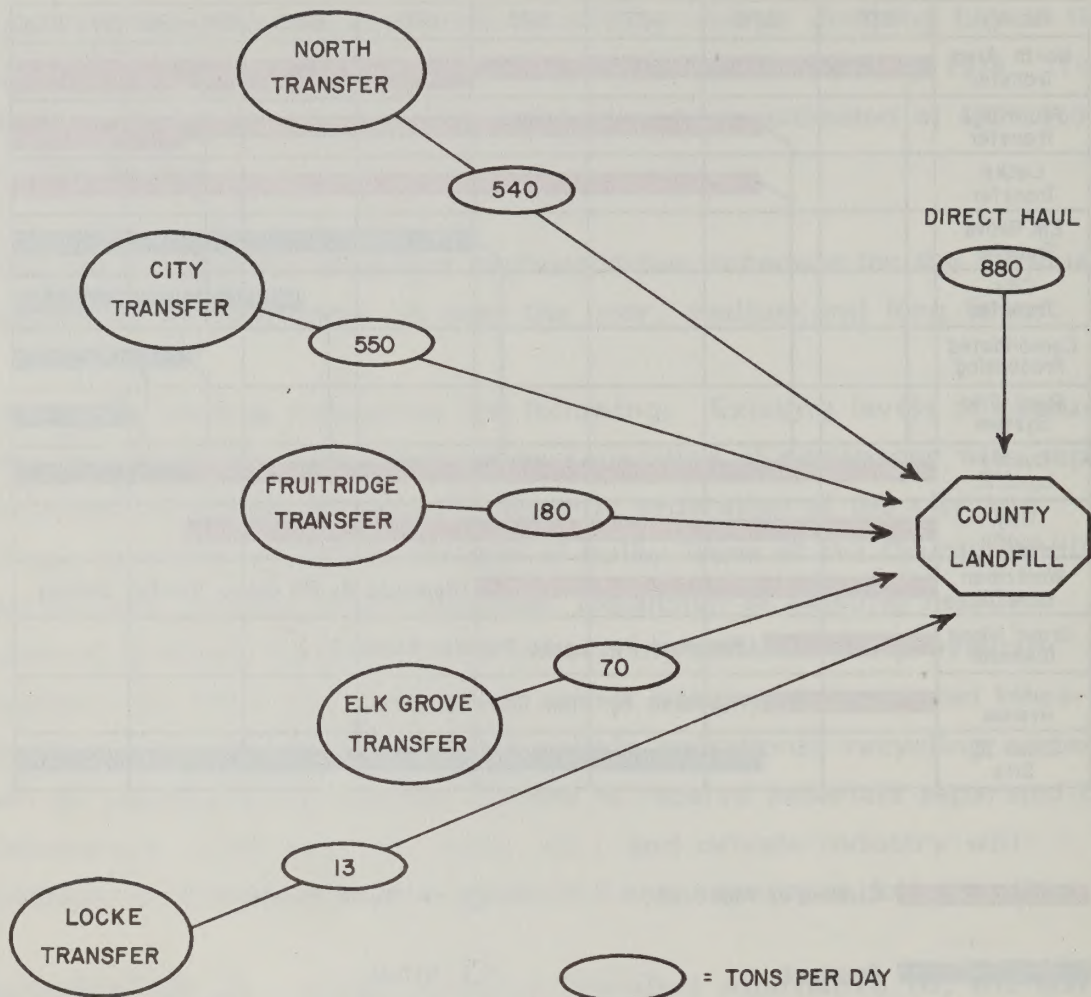
Processed Refuse
or Residue Only

③ Residue

A. Depends on J.P.A. Decision.

PLATE 7-4 ALTERNATIVE 1A AND 1B IMPLEMENTATION SCHEDULE

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.



This plate shows the relative position of transfer stations and the disposal site in the county and the 1980 waste movement between facilities under alternative IB.

PLATE 7-5
ALTERNATIVE IB—1980 WASTE MOVEMENT

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

processing station which would provide for ferrous metal separation. This station would process (mill) 74 percent of the County's municipal waste stream. The remaining 26 percent would go directly to the County landfill. Waste would reach the processing station via the transfer stations. The transfer station proposed to serve the city in Alternative 1B may not be required if the processing facility is located somewhere convenient to city haul. This will be evaluated by the JPA during 1976. For purposes of analysis, however, it will be assumed that the processing facility will serve the city and that a transfer station specifically for the city will not be required in Alternative 2A, 2B, 2C. Additionally, a transfer station to serve the northeast sector of the County is proposed for inclusion in Alternative 2A. The exact location of this facility would be determined after processing feasibility has been established. The major motivation for this alternative is the desire to develop major resource recovery in Sacramento County.

The processing facility would feature a series of waste grinders capable of handling 30 tons per hour each. Five grinders would mill the County's entire waste stream; however, the grinders would probably be phased into operation over a period of time (maybe several years).

Under Alternative 2A, the milled waste would undergo magnetic separation of ferrous metal. All remaining processed waste would be landfilled at the County disposal site.

The major change in the movement of the County's waste from that experienced in the existing system is that 850 tons per day of waste would be routed from the transfer stations through the Consolidated Processing Station and on to the County landfill. See Plate 7-6 for graphic display of Alternative 2A.

ALTERNATIVE 2B. (Comprehensive Materials Recovery) Alternative 2B includes all activities and projects proposed in Alternative 2A.

Additionally, Alternative 2B proposes to: (1) route 100% of the County's

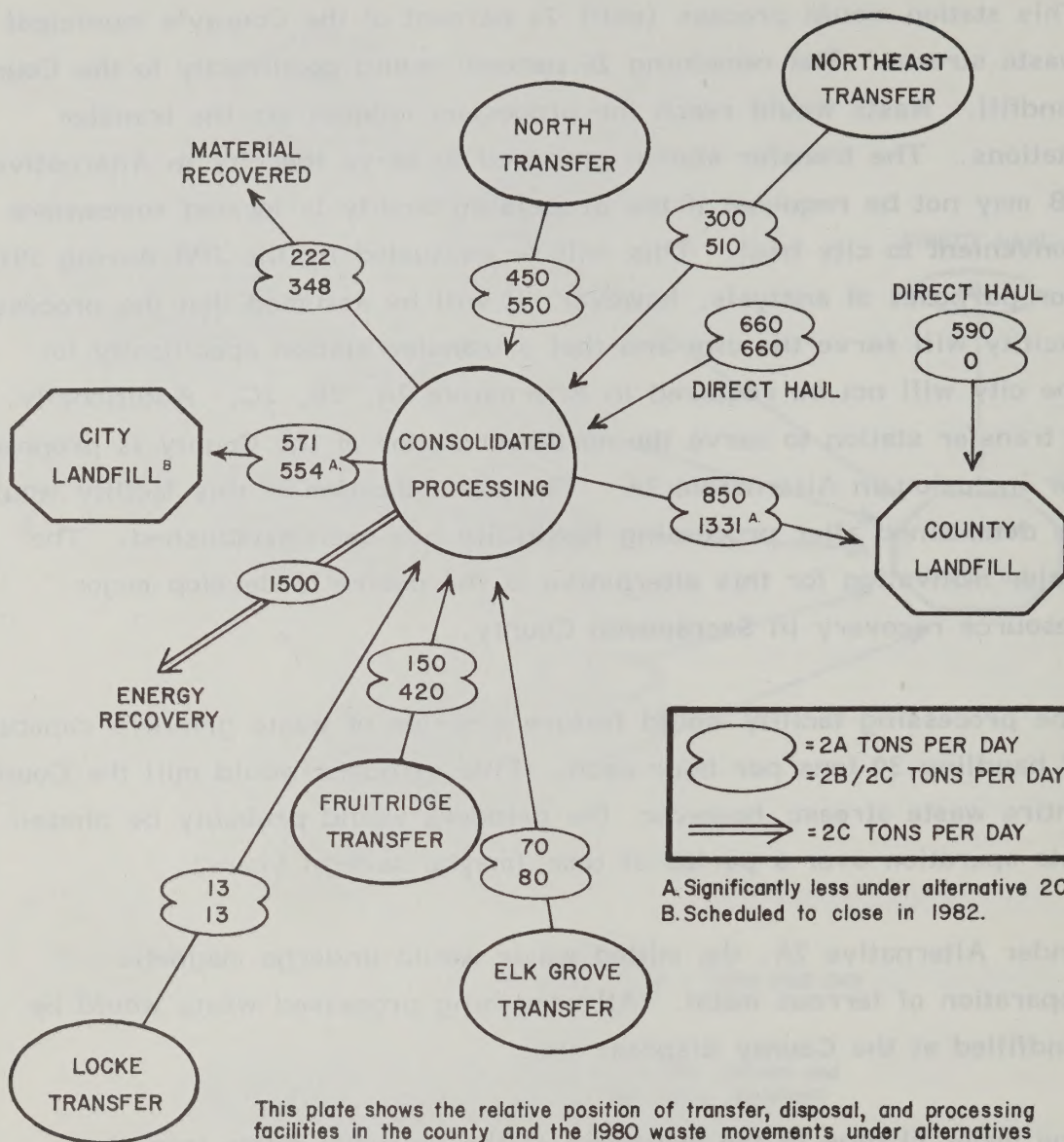


PLATE 7-6
ALTERNATIVES 2A, 2B AND 2C 1980 WASTE MOVEMENT

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

processable waste through the Consolidated Processing Station; and (2) recover glass, ferrous metal, and aluminum through the use of sophisticated separation devices (separation described in Chapter 9). The major motivation for this alternative is the desire to process as much waste as possible, thereby increasing the potential for resource (material and energy) recovery.

The County transfer stations would provide about 70% of the processable waste and the remaining 30% would be hauled directly to the processing station.

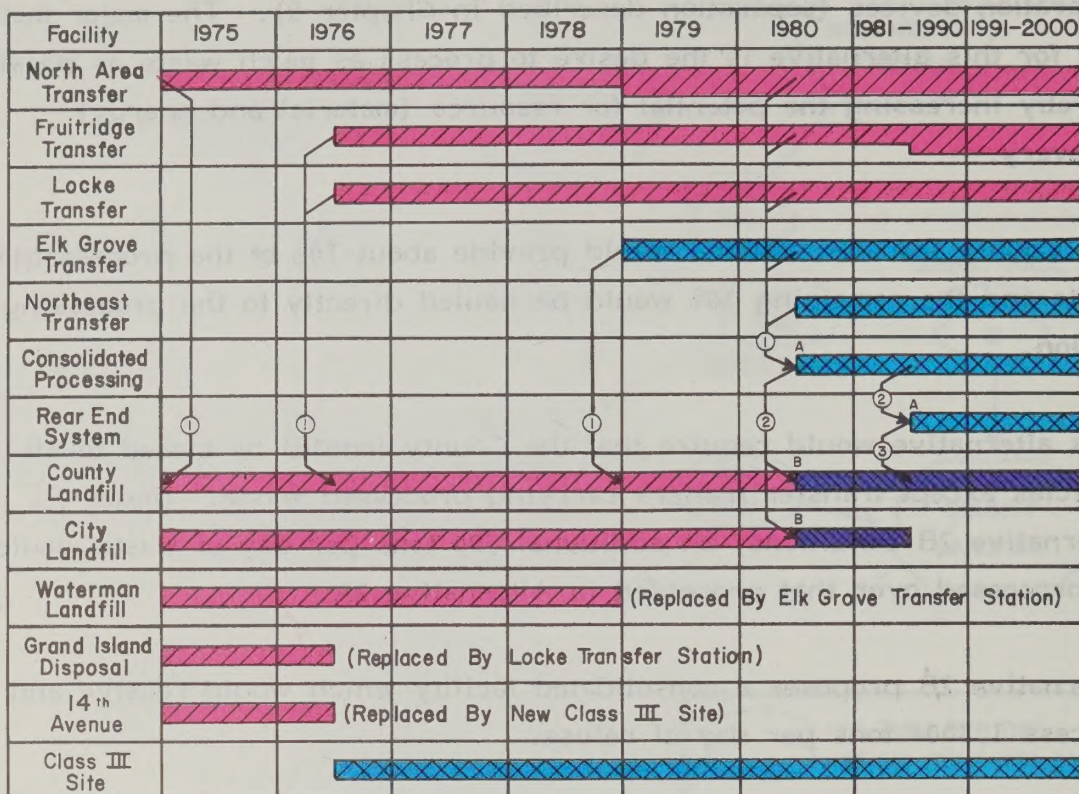
This alternative would require that the County landfill be closed to all vehicles except transfer trailers carrying processed waste. Under Alternative 2B conditions, an additional 590 tons per day of waste would be processed over that processed in Alternative 2A.

Alternative 2B proposes a consolidated facility which would receive and process 1,500+ tons per day of refuse.

If Alternative 2B emerges as the preferred alternative, then a very rigorous planning schedule would allow the processing facility to be operational during 1979. (See Plate 7-6)

The major change in the movement of County waste would be an increase of waste entering the Northeast Transfer Station (210 tons/day), North Area Transfer Station (100 tons/day), and South Area Transfer Station (270 tons/day), which, when summed, equal a 590 tons per day increase in the quantity of waste entering the processing station. See Plate 7-6 for graphic display of Alternative 2B.

ALTERNATIVE 2C. (Materials and Energy Recovery) Alternative 2C includes all activities and projects proposed in Alternative 1A and 2B. Additionally, Alternative 2C proposes to incinerate the organic fraction



 Existing or Approved

 Waste Transfer

 Proposed

① Refuse

 Expansion

② Processed Refuse

 Processed Refuse or Residue Only

③ Residue

A. Implementation to be determined by J.P.A.

B. Direct haul allowed under alternative 2A.

PLATE 7-7 ALTERNATIVE 2A AND 2B IMPLEMENTATION SCHEDULE

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

of the milled waste to produce steam for heating and cooling State Government buildings in downtown Sacramento.

The major motivation for this alternative is (1) the desire to institute a comprehensive resources (material and energy) recovery system, (2) the feasibility of steam production technology, and (3) the ready, local market for steam in the Sacramento area.

Alternative 2C amounts to a complete recovery system featuring a front-end system (Alternative 2B - milling and separation) and a rear-end system (incineration and steam production). The rear-end system and its time of implementation most clearly identify the difference between Alternatives 2A and 2B and Alternative 2C. See Plate 7-6 for a graphic display of Alternative 2C.

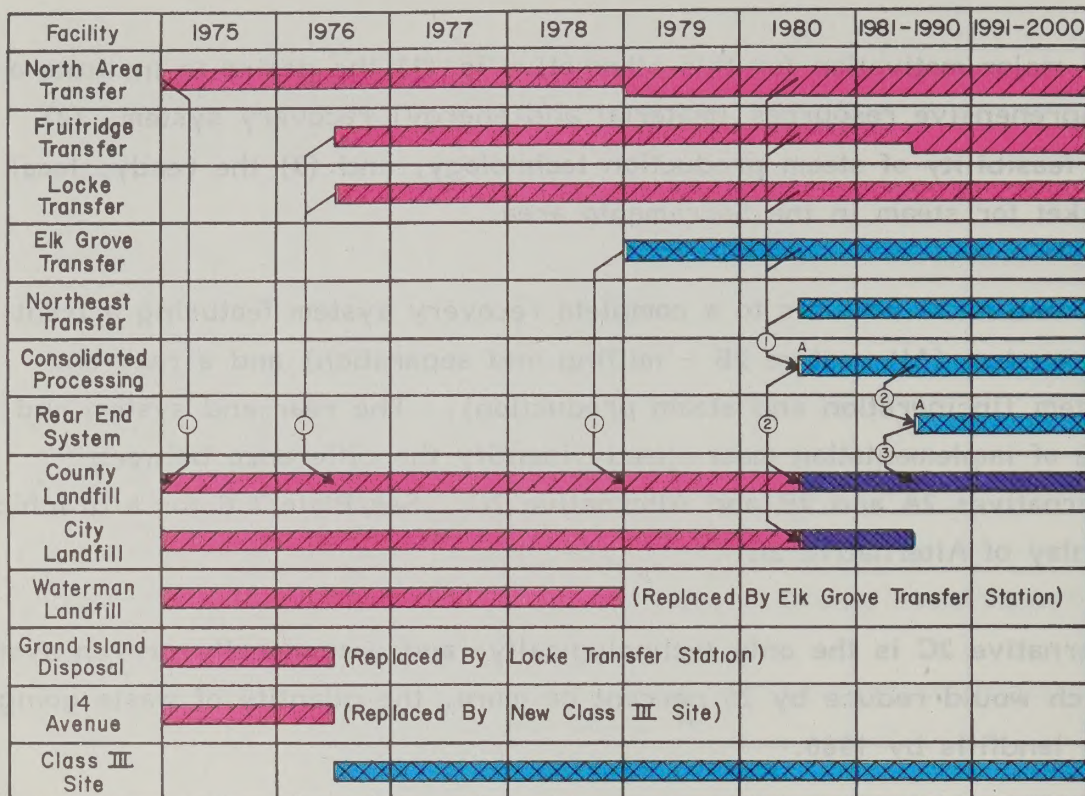
Alternative 2C is the only technologically- and economically-proven system which would reduce by 25 percent or more, the quantity of waste going into landfills by 1980.

There are a number of ways that this alternative could be designed. One way is to mill the waste at the Consolidated Processing Station, truck the organic fraction to an incinerator, produce steam by burning the waste, and finally route the steam to the user. The ultimate design will depend on a number of variables, the configuration of which may change somewhat between now and the implementation date.

Alternative 2C proposes immediate implementation of the steps necessary to achieve a rear-end system by the year 1980 (see Plate 7-8).

ADMINISTRATIVE ALTERNATIVES

Functional Areas. In addition to identifying the location of facilities, it is important to recognize alternative administrative forms. Sacramento County's solid waste management plan recommends action in five functional areas:



 Existing or Approved

 Waste transfer

 Proposed

① Refuse

 Expansion

② Processed Refuse

 Processed Refuse or Residue Only

③ Residue

A. Implementation to be determined by J.P.A.

PLATE 7-8 ALTERNATIVE 2C IMPLEMENTATION SCHEDULE

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

- o *Enforcing State regulations for disposal - The plan will specify how State regulations for the handling and disposal of solid waste will be enforced.*
- o *Establishing ongoing planning and coordination - The plan will specify how revisions to the plan will be accomplished. It will also establish mechanisms for coordinating all solid waste entities in the County. Of particular concern will be planning disposal facilities for the City of Sacramento, because, the landfill for the City of Sacramento will close within seven years. The City of Sacramento and the County will work together to provide a disposal solution to serve the City of Sacramento.*
- o *Enforcing storage and collection standards - The plan will specify how State regulations for storage and collection will be enforced.*
- o *Managing special wastes - The plan will specify enforcement for handling hazardous, inert and other special wastes.*
- o *Facilities Plan - The Facilities Plan has three parts: 1) transfer in unincorporated areas, 2) processing to recover materials and 3) energy recovery/conversion.*

Table 7-1 lists the major administrative alternatives for solid waste management in Sacramento County. The agencies shown form the basis of administrative arrangements for implementing the five areas of the plan. In addition to public agencies, private industry plays a major role within the County. Private industry collects most commercial refuse within the City of Sacramento and the North Area of the County. All of the three southern service areas of the County are served by private collectors.

Enforcing State Regulations for Disposal. As directed by State law, the State Solid Waste Management Board has issued operating standards for handling and disposal of solid waste. These standards, now part of the California Administrative Code (Title 14, Division 7, Chapter 3), will become effective at the time the County plan is adopted or on July 1, 1976, whichever is sooner. Each county is required to designate in its solid waste management plan how these standards will be enforced.

TABLE 7-1
ADMINISTRATIVE ALTERNATIVES

State Regulatory Agencies:	Several regional agencies enforce pollution abatement standards for air and water quality. Of great importance in solid waste management is the Regional Water Quality Control Board.
Department of Community Health:	This department enforces health regulations in the cities and in the County.
County Public Works Department:	The solid waste management division of this department operates a County solid waste enterprise. This division is also the lead agency for the solid waste management plan.
City of Sacramento:	The City of Sacramento operates its own collection and disposal system.
Smaller Cities:	The County has three smaller cities: Folsom, Isleton and Galt.
Special District:	A special district, new or existing, could perform many of the plan's recommendations.
Solid Waste Planning Committee:	A solid waste planning committee appointed by the Board of Supervisors and the cities could provide citizen, technical and industry input to solid waste planning.
Joint Powers Authority:	A joint powers authority is a contractual relationship among public entities.

In addition to the need to enforce State operating standards, Sacramento County should address the problem of coordinating with the Regional Water Quality Control Board. Regional Board 5 issues landfill permits in the County which specify conditions for operation. As a convenience to site operators and an aid to uniform enforcement of standards, any designated enforcement agency for landfill standards should coordinate its activities with the Regional Board.

Each county must also implement a litter control program. The recommended plan for Sacramento County is to designate the County Solid Waste Management Division as litter control coordinator in cooperation with the County Health Department.

The County has already established mechanisms for enforcing disposal health and operations standards. Table 7-2 summarizes the mechanisms. The DCH will continue enforcing health regulations related to solid waste disposal. The County Solid Waste Management Division, part of the County Public Works Department, will enforce all refuse operation regulations. The division will also regulate collectors in the unincorporated areas.

If a new special district or a joint powers agency is formed to recover resources, the County could designate the new agency as the enforcing agency for regulation of disposal. Approval by the City of Sacramento would be necessary for this enforcing agency to operate in the city.

Any Countywide enforcing agency will require approval of the County's four cities. A city that does not approve the recommended method of enforcing State regulations will be required to make its own arrangements to enforce State law. The cities will designate the enforcing agency when they approve the plan.

TABLE 7-2

ADMINISTRATIVE ALTERNATIVES FOR DISPOSAL ENFORCEMENT/SURVEILLANCE

	State Regulatory Agencies	County Health Department	County Public Works Department	City of Sacramento	Smaller Cities	Private Industry	Special District	Solid Waste Planning Committee	JPA
Health/Safety									
Coordination		E, R					C	O	C
Enforcement		E, R					C		C
Financing		E, R					C		C
Pollution Control									
Coordination	E, R	O	O	C				O	C
Enforcement	E, R	O	O	C					C
Financing	E, R			C					C
Litter Control									
Coordination		O	R	R*	E, R*		C	O	C
Enforcement		O	R	R*	E, R*		C		C
Financing			R	R*	E, R*		C		C

*litter control, street sweeping.

E - Existing responsibility.

R - Recommended alternative.

C - Candidate alternative.

O - Referring agency having advisory or review responsibility.

Ongoing Planning and Coordination. The County should establish a permanent solid waste planning committee. This committee would participate in review and coordination of planning activities. Representation should come from government and private agencies with provisions for citizen input.

The State Solid Waste Management Board requires that each county plan designate a mechanism for continuing to plan, coordinate, and review solid waste management activities. The major planning problems are disposal facilities for the City of Sacramento and Countywide resource recovery implementation.

Table 7-3 shows the administrative alternatives for ongoing planning and coordination. Within ongoing planning and coordination are four sub-tasks: 1) public information, 2) master plan review and monitoring, and 3) planning disposal for the City of Sacramento.

A public information program will be required to obtain public support of the plan. This program could inform the public about new disposal standards, litter control, and resource recovery. The solid waste planning committee could be the overall coordinating body for this information program. As an aid to fulfilling this function, the planning committee could use the County Solid Waste Management Division for staff support. The County Solid Waste Management Division should have primary responsibility for public information in regard to its enforcement and litter control programs. Similarly, a joint powers authority or special district created to conduct resource recovery could participate in public information programs for resource recovery.

The Solid Waste Management Division will also have primary responsibility for monitoring and reviewing the plan. The solid waste planning committee could serve as a forum for plan monitoring and review.

TABLE 7-3

ADMINISTRATIVE ALTERNATIVES FOR ONGOING PLANNING AND COORDINATION

	State Regulatory Agencies	County Health Department	County Public Works Department	City of Sacramento	Smaller Cities	Private Industry	Special District	Solid Waste Planning Committee ¹	JPA
Public Information									
Coordination			E, R ²					O	C
Operation			E, R ²						C
Financing			E, R ²						C
Plan Review and Monitoring									
Coordination			R	O	O		C	O	C
Planning			R	O	O		C		C
Financing			R	O	O		C		C
Plan City Disposal Facilities									
Coordination			R	R		O	C	O	C
Planning			R	R		O	C		C
Financing			R	R		O			

1 - Solid waste planning committee oversees planning and coordination.

2 - County public works department conducts public information campaign for litter abatement, and for plan elements in general.

E - Existing responsibility.

R - Recommended alternative.

C - Candidate alternative.

O - Referring agency having advisory or review responsibility.

The plan contemplates closure of the city landfill within seven years. The city has several alternatives for providing new disposal facilities. One alternative is to plan with the County for use of the County landfill. To accomplish this planning, some form of agreement should exist between the city and County for joint planning. Also, private industry should participate in finding solutions. Thus, action by many actors will be necessary for new disposal facilities. Finally, the County is bound by State requirements to investigate recovery programs. Planning and coordination on a Countywide level are needed to meet these requirements. Table 7-3 summarizes the participants in this planning.

Enforcing Storage and Collection Standards. Table 7-4 presents administrative alternatives and recommendations for enforcing State storage and collection standards. These standards are of two types. First, service standards, which are now administered by both the cities and the County, specify frequency of collection, permit conditions, and type of service. Distinguished from service standards are health and safety standards, which have to do with vector control, safety and cleanliness of vehicles, and type of storage containers. These are administered by the County Health Agency.

The recommendations for enforcing storage and collection standards recognize existing divisions of responsibility. The cities have now, and should have in the future, primary responsibility for enforcing service standards in the incorporated areas. The Solid Waste Management Division should have this responsibility in unincorporated areas.

Health and safety enforcement is now the responsibility of the DCH. The recommendation presented in Table 7-4 is that the DCH continue enforcing health and safety regulations both in the unincorporated and incorporated areas.

TABLE 7-4

ADMINISTRATIVE ALTERNATIVES FOR STORAGE AND COLLECTION

	State Regulatory Agencies	County Health Department	County Public Works Department	City of Sacramento	Smaller Cities	Private Industry	Special District	Solid Waste Planning Committee	JPA
Service Standards									
Administration			E, R ¹	E, R ²	E, R ²		C	O	C
Enforcement			E, R ¹	E, R ²	E, R ²		C		C
Financing			E, R ¹	E, R ²	E, R ²		C		C
Health/Safety									
Administration		E, R			C		C	O	C
Enforcement		E, R			C		C		C
Financing		E, R			C		C		C

- 1 - County department enforces service standard in unincorporated areas.
 2 - Cities enforce service standards in incorporated areas.
 E - Existing responsibility.
 R - Recommended alternative.
 C - Candidate alternative.

Monitoring Special Wastes. Special wastes are wastes handled outside of the municipal waste system. These are: 1) Group 1 wastes, which may be hazardous, 2) Group 3 wastes, which are inert, and 3) other miscellaneous wastes, such as dead animals and hospital waste. Table 7-5 summarizes the administrative alternatives for monitoring special wastes.

Handling of Group 1 wastes is currently regulated by the State Water Quality Control Board through the regional Water Quality Control Board. Almost all Group 1 wastes are handled by private collectors. The recommended administration for regulation, operation, and financing of Group 1 waste handling recognized the existing division of responsibility. The regional Water Quality Control Board and the Solid Waste Division should coordinate the enforcement of standards for handling Group 1 waste.

Because Group 3 wastes are inert, they present a less difficult disposal problem than Group 1 wastes. Using these wastes as landfills for sites not suitable for municipal waste can conserve valuable municipal refuse landfill capacity. The County Solid Waste Division should be designated as the agency responsible for monitoring and directing Group 3 wastes. Private industry will continue to handle this waste.

Miscellaneous special wastes are currently monitored by the DCH. This arrangement should continue by coordination with the Solid Waste Management Division.

Facilities Administration. Five alternatives have been identified in this chapter for handling and disposal of Sacramento County's solid waste. The alternatives fall into two Groups: 1) continued landfilling of all wastes with a series of transfer stations, and 2) resource recovery with landfilling of residues.

Table 7-6 shows administrative alternatives for these Facilities. The three basic alternatives are these:

TABLE 7-5

ADMINISTRATIVE ALTERNATIVES FOR SPECIAL WASTE MANAGEMENT

	State Regulatory Agencies	County Health Department	County Public Works Department	City of Sacramento	Smaller Cities	Private Industry	Special District	Solid Waste Planning Committee	JPA
Group 1 Waste Regulation	E, R	O	O			O		O	
Operation						E, R			
Financing						E, R			
Group 3 Waste Administration		O	R					O	
Operation						E, R			
Financing						E, R			
Other Special Waste Administration		R	R						
Operation						E, R			
Financing						E, R			

E - Existing responsibility.

R - Recommended alternative.

C - Candidate alternative.

O - Referring agency having advisory or review responsibility.

TABLE 7-6

ADMINISTRATIVE ALTERNATIVES FOR FACILITIES PLANS

	Regional Agencies	County Health Department	County Public Works Department	City of Sacramento	Smaller Cities	Private Industry	Special District	Solid Waste Planning Committee	JPA
Build Transfer Stations									
Administer			R					O	
Operate			C			C	C		C
Finance			C			C	C		C
Build Processing Station									
Administer			C	C			C	O	C
Operate			C	C		C	C		C
Finance			C	C		C	C		C
Build Energy Recovery									
Administer			C	C			C	O	C
Operate			C	C		C	C		C
Finance	C		C	C		C	C		C

R - Recommended alternative.

C - Candidate alternative.

O - Referring agency having advisory or review responsibility.

- o *County agency* - A department of County government, most probably the Public Works Department, could be designated the lead agency in implementing all Countywide solid waste management functions. This department would report to the Board of Supervisors. It would coordinate its actions with the city councils. The Board could establish an advisory committee made up of representatives of the cities and private industry to monitor the actions of public works.
- o *Joint powers agreement* - A joint powers agreement between the County and the City of Sacramento could finance, build and operate any of the new facilities station. This agreement could be established to administer only facilities requiring joint administration.
- o *Special district* - A County Sanitation District (CSD) or a County Service Area (CSA) could finance, build and operate a processing station.

With any of these three administrative alternatives private operation and financing is possible and may be desirable. Any of the administrative forms could contract with private industry to build and operate facilities. Alternatively, any of these administrative forms could grant an operating franchise to private industry. In the first situation, private industry would be paid with contract payments. In the second situation private industry would levy its own gate fees. These gate fees would require public review.

In choosing between the three administrative alternatives, several characteristics should be considered. The following discusses the three alternatives in terms of: 1) purpose, 2) formation, 3) representation, 4) voting rules, 5) operating powers, and 6) financing powers.

Purpose. Before forming any new organization--joint powers authority or a special district--the purpose should be clearly defined. Any new organization to conduct resource recovery will probably grow directly out of the relationship between the City of Sacramento and the County to plan disposal facilities for the city. As the resource recovery

becomes clearer, the planning relationship could easily be expanded or changed to a stronger administration.

Formation. Forming a joint powers authority between the City of Sacramento and the County would require careful negotiation, based on an established working relationship. The first issue to be negotiated is who will govern the JPA. The City of Sacramento and the County face two choices. Choice one is a separate Board of Directors. As a second choice, either the County or the City of Sacramento could be designated to own and operate the joint facilities.

A separate Board of Directors would have representatives from both the City of Sacramento and the County. The smaller cities could also be represented. The JPA Board would be an independent board. Its operating powers would be carefully defined by the contract among the City of Sacramento, the County, and the smaller cities.

Designating either the City of Sacramento or the County to own and operate joint facilities would place either the City of Sacramento or the County in complete control of the JPA. This control may be unacceptable to either the City of Sacramento or the County.

Other issues of negotiation in forming a JPA are these: What should be the representation of the City of Sacramento and County on the Board of Directors? How large a majority on the Board is needed to make decisions? What powers should the JPA exercise?

In contrast to the JPA, the other administrative alternatives require very little negotiation. Formation of a CSD or CSA is by resolution of the Board of Supervisors with concurrence of the City Council. Representation, voting rules, and operating powers are all specified by statute. Designating the Public Works Department would require some form of agreement with the city.

Representation. Representation will be a sensitive issue in any joint venture between the City of Sacramento and County. With a JPA, this representation is flexible. The JPA Board could be composed of any mutually agreeable number of representatives from the City of Sacramento and the County. Under a CSD, representation is fixed by statute that would give either the City of Sacramento or the County a voting majority on the Board of Directors. With a CSA or the Public Works Department, the City of Sacramento would have practically no representation.

Voting rules. Often, to prevent the JPA Board from imposing unwanted actions on minority members of the JPA, a voting rule requiring a greater-than-majority approval will be used. For instance, if the City of Sacramento and the County both are equally represented on the Board, a two-thirds or four-fifths majority voting rule could be required to perform certain actions. Imposing a greater-than-majority voting rule does, however, have certain disadvantages. If the voting rule is too severe, the Board becomes unable to make any decisions.

By statute, a CSD has a simple majority voting rule. A CSA or the County Public Works Department would place the County Board of Supervisors in control.

Operating powers. A CSD is clearly empowered to conduct a broad range of solid-waste-related functions. It can conduct planning, regulations, disposal, and transfer, as well as a broad range of functions in waste-water treatment.

Similarly, a CSA or the County Public Works Department could both conduct a broad range of activities. Operation of the CSA or the Public Works Department in the City of Sacramento would require the assent of the city. A JPA can perform only those functions granted to it by its participants.

Financing powers. Under recently enacted legislation (RT 2201 ff) all newly-formed special districts require an election to establish an initial tax rate. To levy a tax, then, a CSD or CSA would require an election over its service area. The alternative to taxing is reliance on gate fees and service charges. A JPA could receive contributions from its members to fund start-up costs. Otherwise it would rely on charges and fees. Financing mechanisms are most completely explained in the next section.

In Conclusion. Of the three administrative alternatives, the joint powers authority approach seems the most desirable. It provides the ability to gear cooperative arrangements between governments to suit the needs of the proposed facilities. It provides the most flexible design of representation and voting rules. Plate 7-9 is a schematic summarizing formation and operation of a joint powers authority.

PLATE 7-9
FORMATION OF A JOINT POWERS AGREEMENTS

JOINT POWERS AGREEMENTS

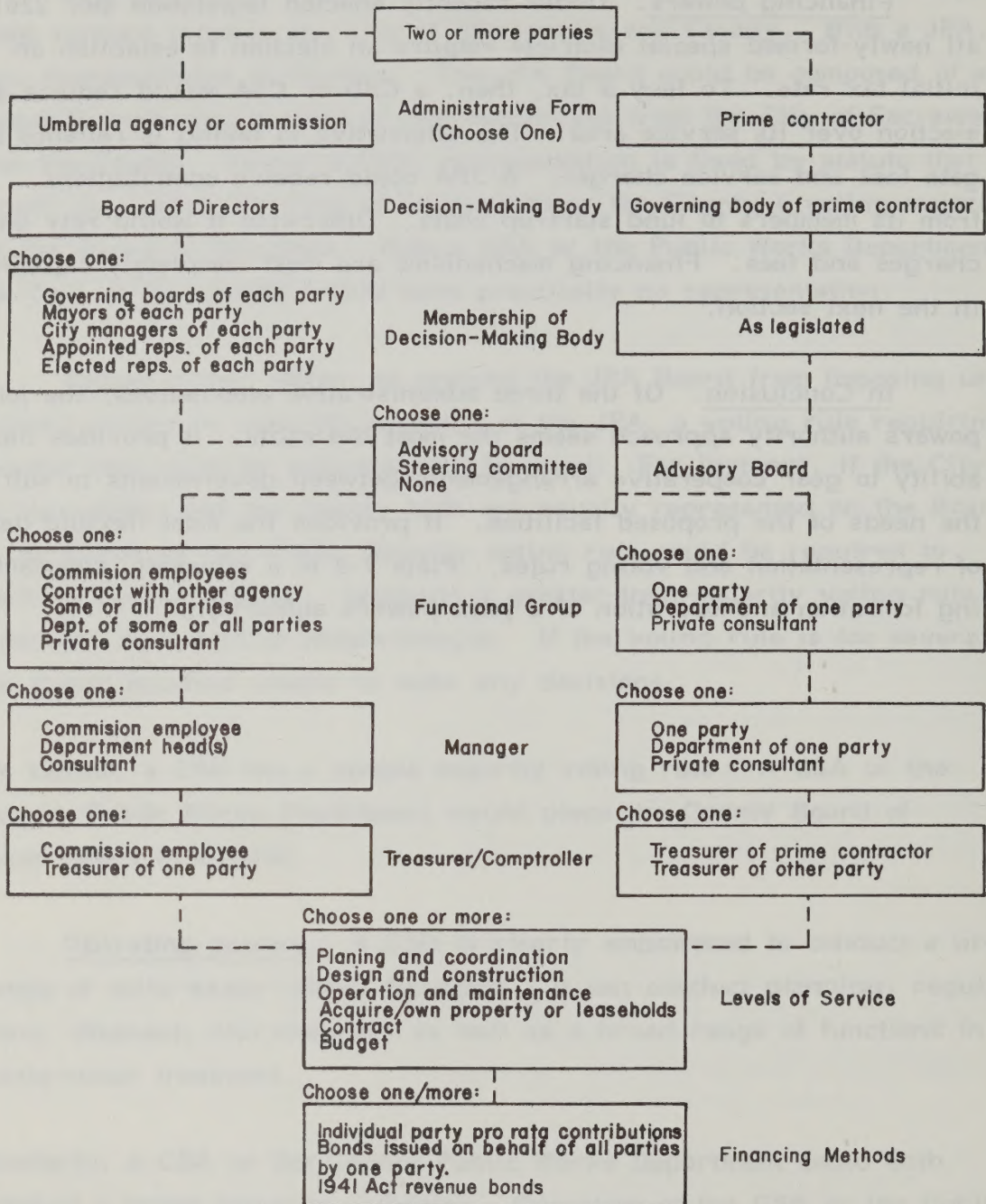


PLATE 7-9
FORMATION OF A JOINT POWERS AGREEMENTS

SOURCE: BARTLE WELLS
ASSOCIATES

Chapter

8

Financial Analysis Of Alternatives

Proposed facilities and programs were presented and described in Chapter 7. The purpose of this chapter is to evaluate the financial implications of the alternative courses of action.

The proposed actions could affect the cost of solid waste management in four different ways:

- o *Because of new operating standards for landfills and for collection, operating costs of the existing system will change. This change is minor.*
- o *With different waste flows at some disposal points, due to consolidation or closing of sites, gate fees will change.*
- o *With new disposal points, haul costs will change.*
- o *Resource recovery will add processing costs to the system which may be partially or totally offset by revenues from recovered resources.*

FINANCING METHODS AND COSTS

Capital Costs: Table 8-1 shows the estimated capital costs of facilities for each of the five alternatives. The costs are shown for each program component within each alternative. No attempt has been made to project inflation.

Bond Issues. Capital costs may be financed by revenue bonds. Tables 8-2A and 8-2B show the equivalent revenue bond issues that would be necessary to construct each alternative. The bond issues are based on construction costs and design costs shown in Table 8-1.

Table 8-2A shows the financing program for the two transfer station alternatives. These alternatives have a 12-month construction period. Funded interest is provided from the bond issue for the construction period and one year thereafter.

Table 8-2B shows the financing program bond issues for the resource recovery alternatives. The bond issues shown for alternatives 2A and 2B are for the processing station only; they do not include any transfer stations. The bond issue shown for alternative 2C is for energy recovery only. It does not include transfer or processing. Thus, the bond issue to build transfer, processing, and energy recovery stations would be the sum of the bond issue shown in Tables 8-2A and 8-2B.

REVENUE SOURCES AND COLLECTION METHODS

Subsidies. Transfer facilities in the rural areas present a special financial problem. Because most rural transfer stations are small, their cost per ton is high. This high cost means that they must be subsidized so that their gate fees are not exorbitant. A gate fee set too high encourages illegal dumping. Two of the proposed stations have already been subsidized with general revenue sharing. Such subsidy may not continue.

TABLE 8-1

CAPITAL COSTS OF PROPOSED FACILITIES¹ (\$000)

	Alternatives				
	1A	1B	2A	2B	2C
Transfer ²	\$ 745 ³	\$2,110 ⁴	\$ 2,110 ⁴	\$ 2,110 ⁴	\$ 2,110 ⁴
Transport	295	490	830 ⁵	1,240 ⁵	1,240 ^{5,6}
Processing and Materials recovery	--	--	7,700 ⁷	15,290 ⁸	15,290 ⁸
Energy Recovery	--	--	--	--	33,000 ⁹
Total cost	\$1,040	\$2,600	\$10,640	\$18,640	\$51,640

1 - All costs in 1975 dollars (inflation not included).

2 - Does not include capital costs of two recently approved stations financed through revenue sharing.

3 - Includes \$40,000 design costs.

4 - Includes \$105,000 design costs.

5 - Includes transport from processing to landfill.

6 - Includes transport from processing to energy recovery and landfilling of residue.

7 - Processing and magnetic separation only (includes \$700,000 of design costs).

8 - Processing, air classification, full scale materials recovery (includes \$1,390,000 of design costs).

9 - Includes \$3,000,000 design costs.

Source: Staff Studies

TABLE 8-2A

**FINANCING PROGRAM INVOLVING REVENUE BONDS AND FACILITIES
FOR TRANSFER ALTERNATIVES 1A AND 1B**

	Alternative 1A	Alternative 1B
Construction costs ¹	\$705,000	\$2,005,000
Design costs ²	40,000	105,000
Funded interest ³	154,700	440,000
Reserve fund ⁴	98,800	280,100
Issuance costs ⁵	13,800	39,500
Earnings ⁶	<u>(42,300)</u>	<u>(119,600)</u>
Total bond issue ⁷	\$970,000	\$2,750,000

1 - Expended over 12-month construction period.

2 - Payable immediately out of bond issue.

3 - Funded during construction and for 1 year after completion.

4 - 1 year of debt service.

5 - Estimated at .6 percent of issue.

6 - Earnings at .5 percent per month on deposits during construction.

7 - 20 years at 8 percent interest.

Source: Bartle Wells

TABLE 8-2B

FINANCING PROGRAM INVOLVING REVENUE BONDS AND FACILITIES FOR RESOURCE RECOVERY ALTERNATIVES 2A, 2B, AND 2C

	Processing only ¹		Energy recovery only ¹
	Alternative 2A	Alternative 2B	Alternative 2C
Construction costs	\$ 7,000,000 ²	\$13,900,000 ²	\$30,000,000 ³
Design costs ⁴	700,000	1,390,000	3,000,000
Funded interest ⁵	2,100,000	4,000,000	10,360,530
Reserve fund ⁶	1,050,000	2,000,000	4,470,000
Issuance costs ⁷	63,000	120,000	302,100
Earnings ⁸	(441,000)	(1,410,000)	(3,432,630)
Total ⁹	\$10,500,000	\$20,000,000	\$44,700,000

1 - Bond issues do not include transfer stations shown on Table 8-2A

2 - Expended over 18-month construction period.

3 - Expended over 24-month construction period.

4 - Payable immediately out of bond issue.

5 - Funded over construction period and for 1 year after completion.

6 - 10 percent of bond issue.

7 - Estimated at .6 percent of issue.

8 - Earnings at .5 percent per month on deposits during construction.

9 - 20 years at 8 percent interest.

Source: Bartle Wells

Therefore the County must decide how to subsidize these high-cost-per-ton stations.

The County has three alternatives for subsidizing its smaller transfer stations. These are:

- o Form a County service area over the areas that use the rural transfer stations. This district would require an election to establish a property tax rate. The district could then tax the areas that use the rural disposal sites.*
- o Levy land use fees to pay the costs of rural transfer. The County could establish zones of benefit and, without a tax rate election, levy fees over each zone based on the solid waste generating characteristics of parcels within each zone.*
- o Subsidize the gate fees of high unit cost transfer facilities by higher gate fees at the County landfill and at other low unit cost transfer stations.*

The first of these alternatives requires formation of a special district. To levy property taxes in a newly formed special district requires, under the recently enacted tax rate limitations (Revenue and Taxation Code Section 2201 ff), a tax rate election.

Land use fees, the second subsidy alternative, requires no tax rate election. It would require establishing a billing system based on developing an extensive land classification system.

The third subsidy alternative would create a subsidy from some transfer and disposal facilities to others. This subsidy would raise gate fees at high usage facilities to subsidize low usage facilities. Such a subsidy policy should be implemented with caution. If the gate fees at County transfer stations are high because of a subsidy policy, users will tend to haul waste directly to low gate fee landfills and avoid using the transfer stations. They may, instead, dump illegally. The County's subsidy policy should raise gate fees both at the County landfill and at the transfer facilities so that the avoidance of the transfer facilities and illegal dumping will not occur.

The remaining analysis of the proposed facilities assumes uniform gate fees at all disposal facilities (transfer stations, processing stations, and landfills). This uniform gate fee is not a policy recommendation but it does reflect the weighted average gate fee of the alternatives. Recommendations for a rate structure to obtain the average gate fees shown here will be made in Chapter 10.

Cash Flow and Average Gate Fees. Tables 8-3 through 8-6 show the cash flow of each alternative based on specified average gate fees. These cash flows are based on bond issue amounts calculated in Tables 8-2A and 8-2B. The gate fees are those necessary to build up reserves adequate to provide a 2.0 coverage ratio for bond service (see Appendix J).

The cash flow analysis for the two transfer alternatives show that the County can build and maintain a transfer system for moderate average gate fees of \$4.30 to \$5.65 per ton.

For the processing station, alternative gate fees during the first two years of operation are projected to build up adequate reserves and to cover costs. Revenues from the sale of recovered materials are not shown until the third year of operation. These revenues, if they meet projections, would allow substantial reductions in the gate fees for disposal. Should revenues from the sale of resources accrue earlier than the third year of operation, earlier reductions in the gate fees would be permissible.

In financing the processing stations, special care should be taken to pledge revenues from the sale of recovered materials to the reserve fund. In addition the agency selling the bonds will have to covenant to maintain the fund at a minimum of 2.0 coverage.

Impacts on Costs of Service. Implementation of any one of the alternatives will change the cost of garbage and refuse service by 1) changing the point of disposal and 2) changing the gate fee for disposal. Changing the point

TABLE 8-3

CASH FLOW ANALYSIS - TRANSFER ALTERNATIVE 1A

		1980	1981	1982	1983	1984	1985
Tons/year ¹	Transfer	207.8	210.9	214.1	217.5	220.8	224.2
(000)	Landfill	228.4	231.8	235.2	238.6	242.1	245.7
Average gate fee	Transfer	\$ 7.40	\$ 7.40	\$ 7.40	\$ 7.40	\$ 7.40	\$ 7.40
(\$/ton) ^{2,3}	Landfill	1.50	1.50	1.50	1.50	1.50	1.50
Revenue (\$000)		\$1,880.3	\$1,908.4	\$1,937.1	\$1,967.4	\$1,997.1	\$2,027.6
Gate Fees							
Expenses (\$000)							
Capital							
Transfer stations ⁴		\$ -- ⁵	\$ 98.8	\$ 98.8	\$ 98.8	\$ 98.8	\$ 98.8
Transport ⁶		51.3	51.3	51.3	51.3	51.3	51.3
Total		51.3	150.1	150.1	150.1	150.1	150.1
Operating							
Transfer stations ⁷		\$ 563.2	\$ 574.5	\$ 586.0	\$ 597.7	\$ 609.7	\$ 621.9
Transport ⁷		455.2	464.3	473.6	483.1	492.7	502.6
Landfill ⁸		654.3	664.1	674.0	684.2	694.4	704.9
Total		1,672.7	1,702.9	1,733.6	1,765.0	1,796.8	1,829.4
Total expenses		1,724.0	1,853.0	1,883.7	1,915.1	1,946.9	1,979.5
Net revenues (deficit) (\$000)		\$ 156.3	\$ 55.4	\$ 53.4	\$ 52.3	\$ 50.2	\$ 48.1
Reserves ⁹ (\$000)		\$ 255.1	\$ 310.5	\$ 363.9	\$ 416.2	\$ 466.4	\$ 514.5

1 - Waste flow through County transfer system only.

2 - Average gate fee at landfill and transfer stations.

3 - Gate fee necessary to maintain 1.4 coverage of bond service by current revenues.

4 - Transfer stations financed with bond issues shown in Table II-11A.

5 - Interest funded from bond issue.

6 - Transport equipment financed over 8 years at 8 percent (lease).

7 - Operating expenses projected as increasing 2% per year (does not include capital replacement).

8 - Landfill operating costs estimated at \$1.50 per ton of landfilled waste.

9 - Includes \$98,800 of reserves funded from bond issue.

Source: Bartle Wells

TABLE 8-4

CASH FLOW ANALYSIS - TRANSFER ALTERNATIVE 1B

		1980	1981	1982	1983	1984	1985
Tons/year ¹	Transfer	351.7	356.2	360.8	365.6	370.3	375.1
(000)	Landfill	228.4	231.8	235.2	238.6	242.1	245.7
Average gate fee	Transfer	\$ 6.70	\$ 6.70	\$ 6.70	\$ 6.70	\$ 6.70	\$ 6.70
(\$/ton) ^{2,3}	Landfill	1.50	1.50	1.50	1.50	1.50	1.50
Revenue (\$000)		\$2,699.0	\$2,734.2	\$2,770.2	\$2,807.4	\$2,844.2	\$2,881.7
Gate Fees							
Expenses (\$000)							
Capital							
Transfer ⁴		\$ -- ⁵	\$ 280.1	\$ 280.1	\$ 280.1	\$ 280.1	\$ 280.1
Transport ⁶		85.3	85.3	85.3	85.3	85.3	85.3
Total		85.3	365.4	365.4	365.4	365.4	365.4
Operating							
Transfer ⁷		\$ 787.2	\$ 802.9	\$ 819.0	\$ 835.4	\$ 852.1	\$ 869.1
Transport ⁷		538.6	549.4	560.4	571.6	583.0	594.7
Landfill ⁸		870.2	882.0	894.0	906.3	918.6	931.2
Total		2,196.0	2,234.3	2,273.4	2,313.3	2,353.7	2,395.0
Total Expenses		2,281.3	2,599.7	2,638.8	2,678.7	2,719.1	2,760.4
Net revenues (deficit) (\$000)		\$ 417.7	\$ 134.5	\$ 131.4	\$ 128.7	\$ 125.1	\$ 121.3
Reserves ⁹ (\$000)		\$ 697.8	\$ 832.3	\$ 963.7	\$1,092.4	\$1,217.5	\$1,338.8

1 - Waste flow through County transfer system only.

2 - Average gate fee at landfill and transfer stations.

3 - Gate fee necessary to maintain 1.4 coverage of bond service by current revenues.

4 - Transfer stations financed with bond issue shown in Table II-11A.

5 - First year of interest funded from bond issue.

6 - Transport equipment financed over 8 years at 8 percent (lease).

7 - Operating costs projected at 2% increase per year (does not include capital replacement).

8 - Landfill operating costs estimated at \$1.50 per ton of landfilled waste.

9 - Includes \$280,100 of reserves funded from bond issue.

Source: Bartle Wells

TABLE 8-5

CASH FLOW ANALYSIS - TRANSFER AND PROCESSING - ALTERNATIVE 2A

	1980	1981	1982	1983	1984	1985
Tons/year ¹ (000)	580.1	588.0	596.0	604.2	612.4	620.8
Average gate fee ^{2,3} (\$/ton)	\$ 8.40	\$ 8.40	\$ 8.40	\$ 8.40	\$ 8.40	\$ 8.40
<u>Revenues (\$000)</u>						
Gate Fees	\$4,872.8	\$4,939.2	\$5,006.4	\$5,075.3	\$5,144.2	\$5,214.7
Sale of materials ⁴	--	--	858.2	870.0	881.9	894.0
Total	\$4,872.8	\$4,939.2	\$5,864.6	\$5,945.3	\$6,026.1	\$6,108.7
<u>Expenses (\$000)</u>						
<u>Capital</u>						
Transfer ⁵	\$ -- ⁶	\$ 280.1	\$ 280.1	\$ 280.1	\$ 280.1	\$ 280.1
Transport ^{7,8}	144.4	144.4	144.4	144.4	144.4	144.4
Processing ⁹	--	1,069.4	1,069.4	1,069.4	1,069.4	1,069.4
Total	\$ 144.4	\$1,493.9	\$1,493.9	\$1,493.9	\$1,493.9	\$1,493.9
<u>Operating</u>						
Transfer ¹⁰	\$ 787.2	\$ 802.9	\$ 819.0	\$ 835.4	\$ 852.1	\$ 869.1
Transport ^{10,11}	958.6	977.8	997.3	1,017.3	1,037.6	1,058.4
Processing ¹⁰	1,281.5	1,307.1	1,333.3	1,359.9	1,387.1	1,414.9
Landfills ¹²	696.1	705.6	715.2	725.0	734.9	745.0
Total	\$3,723.4	\$3,793.4	\$3,844.8	\$3,937.6	\$4,011.7	\$4,087.4
Total expenses	\$3,867.8	\$5,287.3	\$4,338.7	\$5,431.5	\$5,505.6	\$5,581.3
Net revenues (deficit) (\$000)	\$1,005.0	\$(348.1)	\$ 525.9	\$ 513.8	\$ 520.5	\$ 527.4
Reserves ¹³ (\$000)	\$2,335.1	\$1,987.0	\$2,512.9	\$3,026.7	\$3,547.2	\$4,074.6

1 - Municipal waste flow through County and City of Sacramento waste disposal systems.

2 - Average gate fee at landfills, transfer stations, and processing stations.

3 - Gate fee necessary to maintain 1.4 coverage by current revenues.

4 - Based on \$20 per ton for ferrous metal.

5 - Transfer stations financed with bond issue shown in Table II-11A.

6 - First year of interest funded from bond issue.

7 - Transport financed over 8 years at 8 percent.

8 - Includes transport to processing and to landfills from processing.

9 - Processing financed with bond issue shown in Table II-11B.

10 - Operating costs increase at 2 percent per year (does not include capital replacement).

11 - Includes transport to and from processing station.

12 - Based on \$1.20 per ton cost.

13 - Includes bond funded reserves for transfer bond issue and processing bond issue. Bond funded reserves \$1,308,100.

TABLE 8-6

CASH FLOW ANALYSIS - TRANSFER AND PROCESSING - ALTERNATIVE 2B

	1980	1981	1982	1983	1984	1985
Tons/year ¹ (000)	580.1	588.0	596.0	604.2	612.4	620.8
Average gate fee ^{2,3} (\$/ton)	\$ 9.70	\$ 9.70	\$ 9.70	\$ 9.70	\$ 9.70	\$ 9.70
Revenues (\$000)						
Gate Fees	\$5,627.0	\$5,703.6	\$5,781.2	\$5,860.7	\$5,940.3	\$6,021.8
Sale of materials ⁴	--	--	2,498.3	2,532.7	2,567.0	2,602.2
Total	\$5,627.0	\$5,703.6	\$8,279.5	\$8,293.4	\$8,507.3	\$8,624.0
Expenses (\$000)						
Capital						
Transfer ⁵	\$ -- ⁶	\$ 280.1	\$ 280.1	\$ 280.1	\$ 280.1	\$ 280.1
Transport ^{7,8}	144.4	144.4	144.4	144.4	144.4	144.4
Processing ⁹	--	2,037.0	2,037.0	2,037.0	2,037.0	2,037.0
Total	\$ 144.4	\$2,461.5	\$2,461.5	\$2,461.5	\$2,461.5	\$2,461.5
Operating						
Transfer ¹⁰	\$ 902.5	\$ 920.6	\$ 939.0	\$ 957.7	\$ 976.9	\$ 996.4
Transport ^{10,11}	1,479.7	1,509.3	1,539.5	1,570.3	1,601.7	1,633.7
Processing ¹⁰	1,741.7	1,776.5	1,812.1	1,848.3	1,885.3	1,923.0
Landfills ¹²	696.1	705.6	715.2	725.0	734.9	745.0
Total	\$4,820.0	\$4,912.0	\$5,005.8	\$5,101.3	\$5,198.8	\$5,298.1
Total Expenses	\$4,964.4	\$7,373.5	\$7,467.3	\$7,562.8	\$7,660.3	\$7,759.6
Net revenues (deficit) (\$000)	\$ 662.6	\$(1,669.9)	\$ 812.2	\$ 730.6	\$ 847.0	\$ 864.4
Reserves¹³	\$2,942.6	\$1,272.7	\$2,084.9	\$2,815.5	\$3,662.5	\$4,526.9

1 - Municipal waste flow through County and City of Sacramento waste disposal systems.

2 - Average gate fee at landfills, transfer stations, and processing station.

3 - Gate fee necessary to maintain 1.4 bond coverage by current reserves.

4 - Based on \$31.05 per ton for recovered aggregate.

5 - Transfer stations financed with bond issue shown in Table II-11A.

6 - First year of interest funded from bonds.

7 - Transport financed over 8 years at 8 percent (lease).

8 - Includes transport to processing and to landfills from processing.

9 - Processing financed with bond issue shown in Table II-11B.

10 - Operating costs increase at 2 percent per year (does not include capital replacement).

11 - Includes transport to and from processing station.

12 - Based on \$1.20 per ton cost.

13 - Includes bond funded reserves for transfer bond issue and processing bond issue. Bond funded reserves \$2,280,000.

of disposal will change the haul cost for garbage service. The change in the gate fee for disposal results from adding new transfer and processing facilities.

Tables 8-7 and 8-8 contain data on the impact of changes haul costs and changed gate fees on the costs of garbage service to a single-family dwelling unit. This change is evaluated in terms of the percent change in the cost per ton. Note that some areas of the County have lower service charges from the facilities plan while other areas have higher costs.

The percentage increases shown in Tables 8-7 and 8-8 should be viewed with some caution. While these percentages may be generally applicable to all classes of users (multi-unit residential, commercial, etc.) a detailed rate study is required to specify exact changes for all classes of users.

Table 8-9 shows the cost impact on service charges for single-family dwelling units in each service area of the County for each alternative. These charges are only estimates and should not be used for setting rates.

TABLE 8-7

FINANCIAL IMPACT OF TRANSFER ALTERNATIVES^{1,2}

Service Area	Current System				Alternative 1A			Alternative 1B		
	Total Cost/Ton	Collection Cost/Ton	Haul Cost/Ton	Disposal Cost/Ton	Haul Cost/Ton	Disposal Cost/Ton	% Change In Total Cost/Ton	Haul Cost/Ton	Disposal Cost/Ton	% Change In Total Cost/Ton
A. City of Sacramento	37.49 ³	30.99	5.30 ³	1.20 ³	11.90 ⁶	2.00 ⁶	20%	5.30	6.70	15%
B. North Area of County	36.71 ³	27.93	6.50 ³	2.28 ^{3,4}	5.78	3.18	1%	5.78	2.98	0%
C. City of Folsom	35.56 ⁵	25.26	8.80 ³	1.50 ³	8.80	1.50	0%	8.80	1.50	0%
D. Independent Disposal Company	24.81 ⁵	16.01	4.80 ³	4.00 ³	4.80	7.40	14%	4.80	6.70	11%
E. Camarillo Sanitary Service	35.40 ⁵	19.40	12.00 ³	4.00 ³	3.67	7.40	-14%	3.67	6.70	-16%
F. Delta Refuse Service	18.63 ⁵	10.73	3.90 ³	4.00 ³	7.35	7.40	37%	7.35	6.70	33%

1 - All costs in 1975 dollars.

2 - Table assumes no change in cost of collection, only in cost of haul and disposal.

3 - Source: Task 1 report.

4 - Weighted disposal cost of North Area Transfer Station and County landfill.

5 - Based on total annual average charges to single family dwelling unit for at least two cans per week service.

6 - Costs based on analysis for new remote landfill - See Appendix K.

Source: Staff and Bartle Wells

TABLE 8-8
FINANCIAL IMPACT OF RESOURCE RECOVERY ALTERNATIVES^{1,2}

Service Area	Total Cost/Ton	Current System			Alternative 2A			Alternative 2B		
		Collection Cost/Ton	Haul Cost/Ton	Disposal Cost/Ton	Haul Cost/Ton	Disposal Cost/Ton	% Change In Total Cost/Ton	Haul Cost/Ton ⁶	Disposal Cost/Ton	% Change In Total Cost/Ton ⁶
A. City of Sacramento	37.49 ³	30.99	5.30 ³	1.20 ³	5.30	8.40	19%	5.30	9.70	23%
B. North Area of County	36.71 ³	27.93	6.50 ³	2.28 ^{3,4}	4.38	8.40	11%	2.20	9.70	8%
C. City of Folsom	35.40 ⁵	25.26	8.80 ³	1.50 ³	4.13	8.40	6%	4.13	9.70	10%
D. Independent Disposal Company	24.81 ⁵	16.01	4.80 ³	4.00 ³	4.80	8.40	18%	4.80	9.70	23%
E. Camarillo Sanitary Service	35.40 ⁵	19.40	12.00 ³	4.00 ³	3.67	8.40	-11%	3.67	9.70	-7%
F. Delta Refuse Service	18.63 ⁵	10.73	3.90 ³	4.00 ³	7.35	8.40	42%	7.35	9.70	49%

1 - All costs in 1975 dollars.

2 - Table assumes no change in cost of collection, only in cost of haul and disposal.

3 - Source: Task 1 report.

4 - Weighted disposal cost of North Area Transfer Station and County landfill.

5 - Based on total annual average charges to single family dwelling unit for at least two cans per week service.

6 - % change computed as change from current system costs.

Source: Staff and Bartle Wells

TABLE 8-9

COST IMPACT ON MONTHLY RESIDENTIAL COLLECTION RATE¹

Service Area		Alternatives					
		Existing	1A	1B	2A	2B	2C ²
A	City of Sacramento Waste Removal Service	\$4.00	\$4.80	\$4.60	\$4.75	\$4.95	\$5.70
B	North Area of County	\$4.00 ³	\$4.05 ³	\$4.00 ³	\$4.45 ³	\$4.35 ³	\$5.20 ³
C	City of Folsom	\$4.75	\$4.75	\$4.75	\$5.05	\$5.25	\$6.00
D	Independent Disposal Company	\$3.25	\$3.70	\$3.60	\$3.85	\$4.00	\$4.80
		(county)					
		\$3.75	\$4.30	\$4.15	\$4.45	\$4.65	\$5.40
		(Galt)					
		\$2.85	\$3.25	\$3.15	\$3.40	\$3.50	\$4.30
		(Elk Grove)					
E	Camarillo Sanitary Service	\$4.75	\$4.10	\$4.00	\$4.25	\$4.45	\$5.25
F	Delta Refuse Service	\$2.50	\$3.45	\$3.35	\$3.55	\$3.75	\$4.55

1 - Based on average rates for two cans per week service.

2 - Assumes no local subsidy for energy recovery.

3 - Unlimited curbside service.

Source: Staff and Bartle Wells

Chapter 9

Detailed Analysis Of Consolidated Processing

INTRODUCTION

The purpose of this chapter is to discuss the implications of implementing complex and comprehensive processing/recovery systems. In this chapter, consolidated processing is described in detail concerning (1) the physical locations of required facilities, (2) timing of implementation for required facilities, and (3) financing analysis for the consolidated processing concept.

CONSOLIDATED PROCESSING CONCEPT

Alternative 2B, consolidated processing, would begin the process of implementing large scale resource recovery. It involves transporting all residential and some commercial solid wastes to a single location for processing and resource recovery. Transportation costs would be minimized by utilizing a series of transfer stations strategically placed throughout the County. All but one of the existing disposal sites will be ex-

hausted or eliminated by 1982. The entire transfer, processing, and disposal system is sized to serve a regional waste management area including communities lying outside the County boundary and within a 50-mile haul radius of the central processing station. One possible geographic arrangement of facilities is shown in Plate 9-1. A complete description of this arrangement is provided in two parts: (1) a discussion of the physical features of the system including transfer and processing facilities; (2) a discussion of the financial implications with recommendations for financing facilities.

Facility Descriptions

The materials handling facilities consist of a system of six transfer stations and one consolidated processing facility. Except for a limited amount of hand salvaging which will occur at transfer stations, all processing and major resource recovery would occur at the processing facility. This arrangement provides for future construction of facilities for energy recovery or some other form of recycling activity during the medium and long-term planning period.

Five of the six transfer stations have been grouped together and called the basic transfer system. The sixth transfer station, the Northeast Transfer Station, is considered separately and only in conjunction with consolidated processing.

Capital requirements for all facilities required to implement consolidated processing is detailed in Table 9-1.

Basic Transfer System. The basic transfer system consists of the existing North Area Transfer Station, the private SAWDCO transfer station, the proposed Fruitridge Transfer Station, the proposed Elk Grove Transfer Station and the proposed Locke Transfer Station. Construction, financing and operating details concerning these basic facilities can be found in Chapter 10.

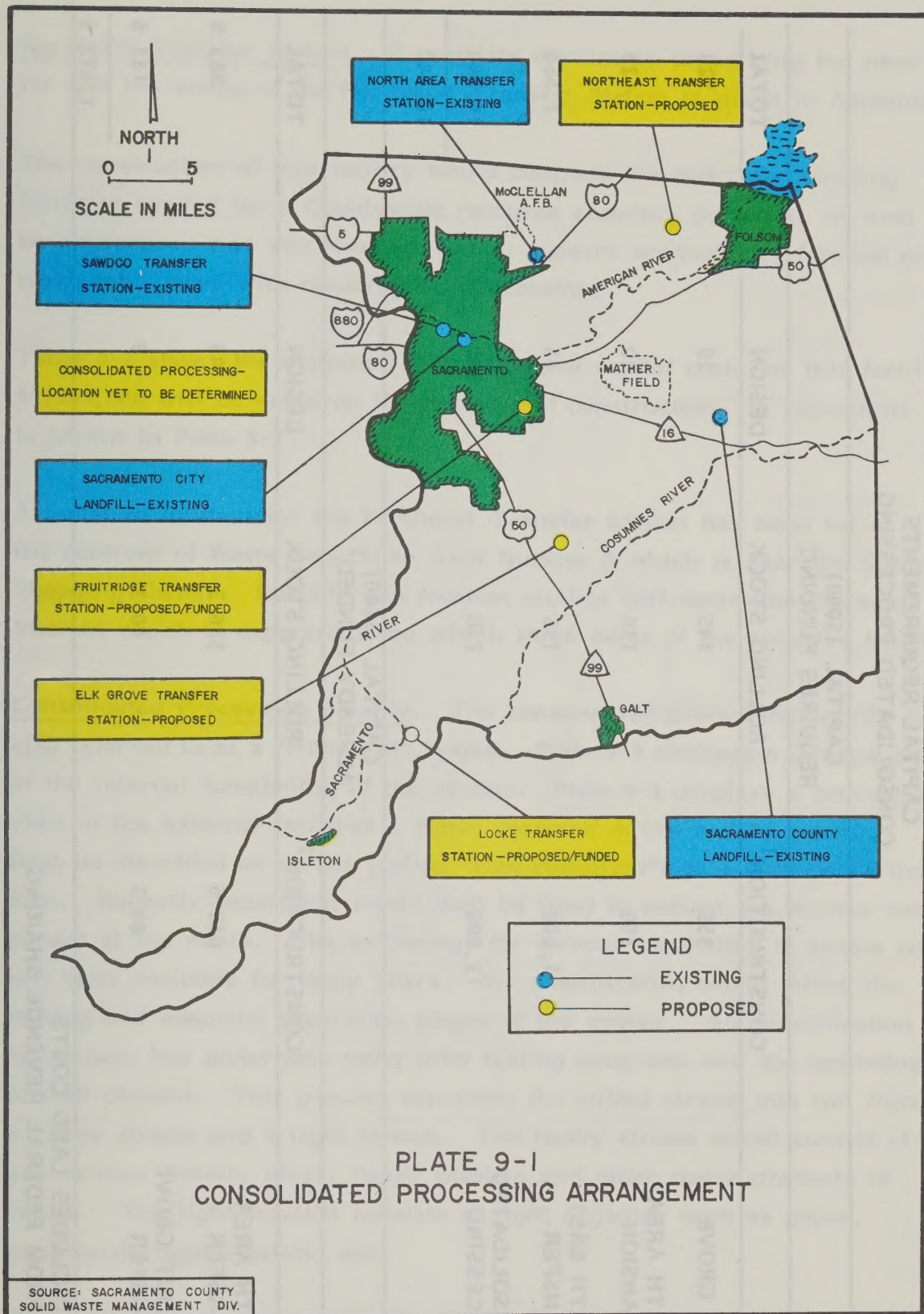


PLATE 9-1
CONSOLIDATED PROCESSING ARRANGEMENT

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

TABLE 9-1

CAPITAL REQUIREMENTS
CONSOLIDATED PROCESSING

CAPITAL (\$000) REQUIRES FUNDING				
	CONSTRUCTION ¹	ROLLING STOCK	DESIGN	TOTAL
ELK GROVE	355	145	20	520
NORTH AREA EXPANSION	350	150	20	520
NORTH EAST TRANSFER	1,300	195	65	1,560
CONSOLIDATED PROCESSING	13,900	750	1,390	16,040
				18,640
CAPITAL (\$000) ALREADY FUNDED ²				
	CONSTRUCTION ¹	ROLLING STOCK	DESIGN	TOTAL
SOUTH AREA TRANSFER	612.6	326.3	45	983.9
WALNUT GROVE TRANSFER	84.3	40.3	9	133.6
				1,177.5

1. INCLUDES LAND COSTS

2. FROM FEDERAL REVENUE SHARING

Northeast Transfer Station. A complete discussion concerning the need for and the sizing of the Northeast Transfer Station is given in Appendix D.

The construction of this facility would complete the materials handling facilities needed for a Countywide resource recovery program. It must be emphasized that this transfer station appears economically feasible only when considered with consolidated processing.

Table 9-2 shows the estimated distribution of capital costs for this facility. \$1,365,000 will be required for design and construction. A conceptual view is shown in Plate 9-2.

A tentative location for the Northeast Transfer Station has been set at the centroid of Waste Generation Area Number 5 which is near the Sunrise Shopping Center. Specific site location studies will determine the exact location which is expected to be within three miles of the tentative location.

Consolidated Processing Facility. The consolidated processing facility is also referred to as a "front end" system. Plate 9-3 displays a conceptual view of the internal functioning of the system. Plate 9-4 displays a conceptual view of the external facilities. Waste received at the facility would first be shredded or milled (called "size reduction") to a uniform particle size. Magnetic separation would then be used to extract the ferrous component of the waste. The technology for ferrous separation is simple and has been available for many years. Air classification would follow the milling and magnetic separation stages of the system. Air classification technology has undergone many pilot testing programs and the technology is well defined. This process separates the milled stream into two fractions; a heavy stream and a light stream. The heavy stream would consist of non-ferrous metals, glass, heavy plastics and other dense products of refuse. The light fraction consists of light organics such as paper, cardboard, light plastics, etc.

TABLE 9-2
CAPITAL FOR NORTHEAST
TRANSFER STATION

Description	Capital (\$)
Concrete	\$ 165,000
Excavation	\$ 37,000
A. C. Paving	\$ 103,000
Scale - Scalehouse	\$ 47,000
Fencing	\$ 37,000
Landscaping	\$ 58,000
Site Electric	\$ 35,000
Sewer - Water (on site)	\$ 29,000
Site Work	\$ 12,000
Office - locker building	\$ 87,000
Pit area building	\$ 260,000
Operating equipment (internal)	\$ 130,000
Subtotal	\$1,000,000
Contingencies	\$ 150,000
Land Costs - 15 acres at \$10,000/acre	\$ 150,000
Sub total	\$1,300,000
Design	\$ 65,000
TOTAL (excluding transfer vehicles)	\$1,365,000

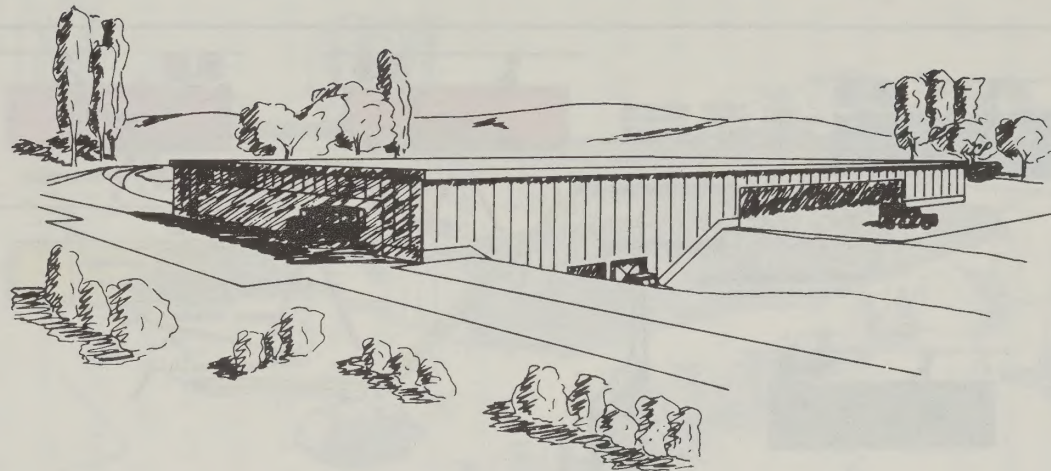


PLATE 9-2
CONCEPTUAL NORTHEAST TRANSFER STATION

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

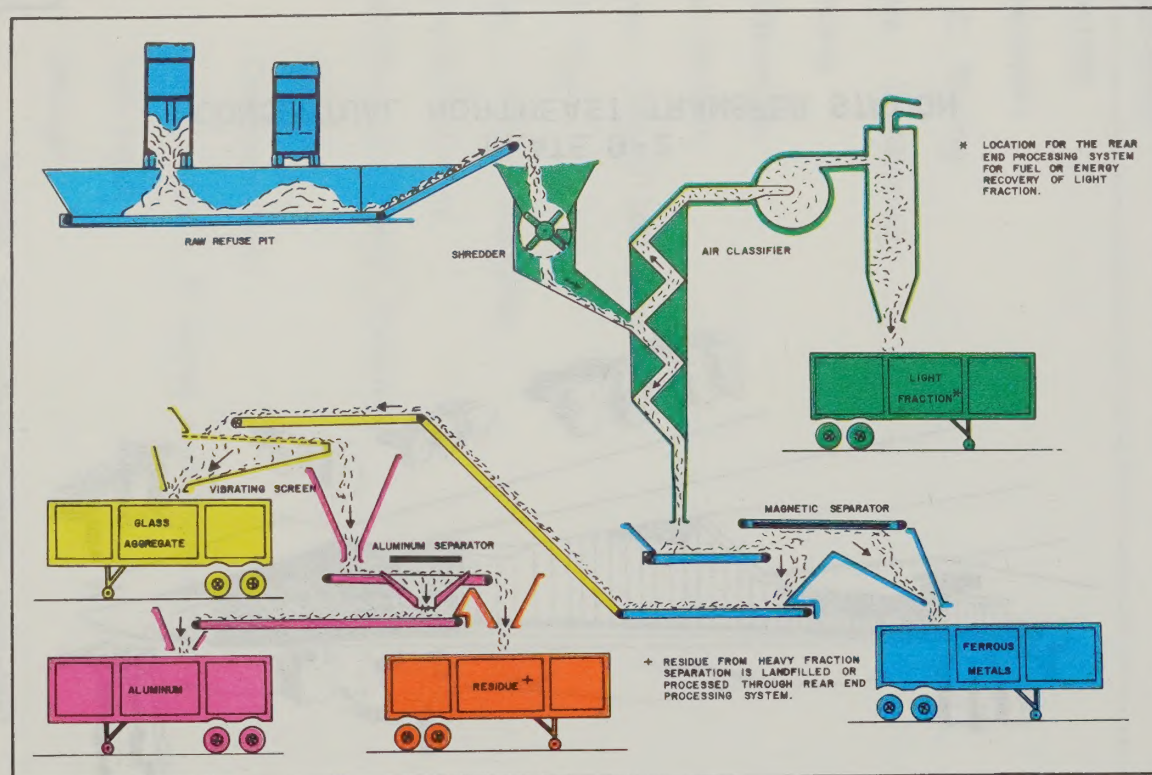


PLATE 9-3
CONCEPTUAL FRONT END SEPARATION SYSTEM

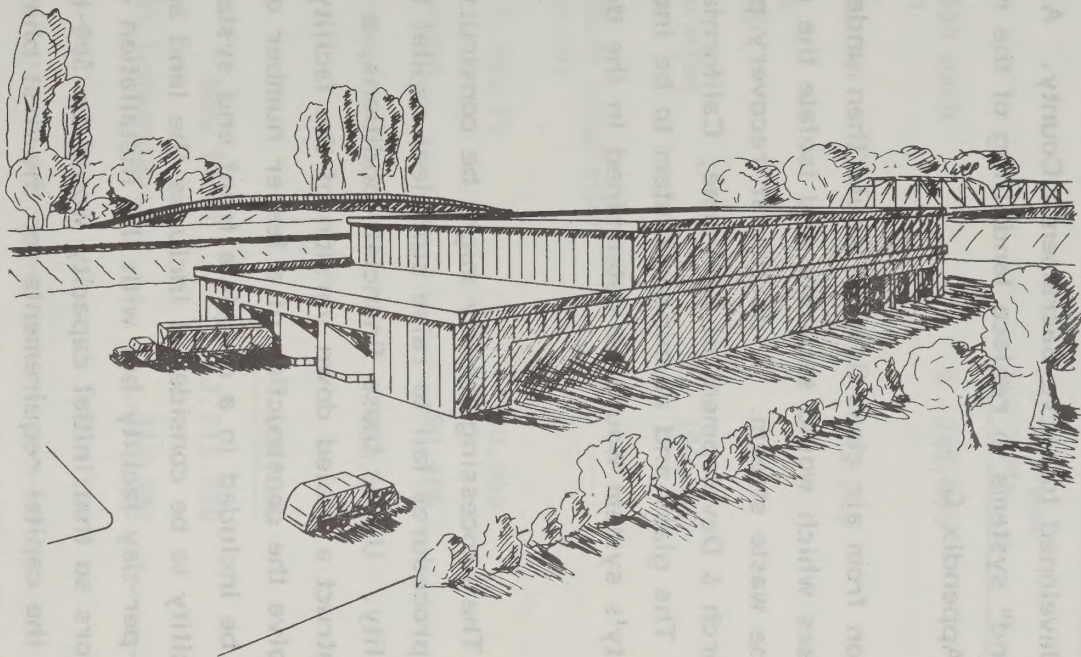


PLATE 9-4
CONCEPTUAL CONSOLIDATED PROCESSING FACILITY

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

Initially, it is planned to landfill the light fraction. Advantages of land-filling milled refuse are reported from many sources, especially Madison, Wisconsin, where milling of refuse followed by landfill has occurred for over ten years. A discussion of landfilling milled refuse appears in Appendix C. Landfilling of the light organics would continue until a "rear end" system is developed to serve Sacramento County. A discussion of potential "rear end" systems to replace landfilling of the milled fraction is presented in Appendix G.

The heavy fraction from air classification would then undergo specialized treatment processes which would separate and isolate the glass and aluminum from the waste stream. A particular recovery process developed by Garrett Research & Development of La Verne, California, is described in Appendix G. The glass and aluminum system to be incorporated in Sacramento County's system would be determined in the design phase of development.

Phasing. The processing facility might be constructed in phase if initial financing procedures fail to raise sufficient capital to construct the complete facility. Under those financial conditions, a first phase effort would construct a scaled down version of the facility. The first phase would involve the construction of a lesser number of the same units which will be included in a complete front end system. The minimum size facility to be considered includes the land and buildings to hold a 1,500-ton-per-day facility but with the installation of only two mills and conveyors so that initial capacity would be 500-tons-per-day. Table 9-3 shows the capital requirements for the first phase. The final phase would be construction and operation of the complete 1,500-ton-per-day facility.

If adequate funding is obtained early in the planning schedule, then phase one and two could be combined. The larger facility would be desired since its output would provide a greater quantity of resources as well as more economical operations at landfills.

TABLE 9-3

**CAPITAL REQUIREMENTS FOR CONSOLIDATED PROCESSING
AND MILLING FACILITY
1500 TONS/DAY**

Description	Capital (\$)	
	First Phase 500 TPD	Final Phase* 1500 TPD
Mills @ \$170,000 each (30 THP each)	\$ 340,000	\$ 850,000
25% for installation	85,000	212,500
Air classifiers @ \$300,000 each	---	1,500,000
Magnetic Separation @ \$50,000 each	100,000	250,000
Glass & Aluminum Separation (Garrett Research)	---	4,200,000
Conveyors @ \$1,500/Ft	900,000	2,250,000
10% for installation	90,000	225,000
Receiving, Reloading & Building	1,000,000	1,000,000
Land	200,000	200,000
Sub Total	2,715,000	10,687,500
30% Contingency	814,500	3,206,250
	3,529,500	\$13,900,000

*includes first phase cost

Energy Recovery. Study and testing of potential "rear end" systems to serve the planning region would begin after the first or final phase of consolidated processing is in operation. A discussion of candidate systems is presented in Appendix H. A decision of which "rear end" system would be appropriate for Sacramento County would emerge from this study. Implementation and operation of the recommended "rear end" system would occur as an extension of the facilities installed up to that time. It is apparent under existing economic conditions that whatever system becomes operational must generate revenues which will offset its cost. The value of waste as a resource must match or exceed the value of alternative resources.

IMPLEMENTATION OF CONSOLIDATED PROCESSING

The timing of the specific actions required to implement consolidated processing programs is presented in the following sections. The specific programs are presented in summary form, by functional activity, and during the year in which programs are to begin. This schedule assumes that the decision to implement consolidated processing will be made in 1976. A delay in this decision would change the date shown for some programs. Plate 9-5 shows the implementation sequence.

1976

Adopt Plan

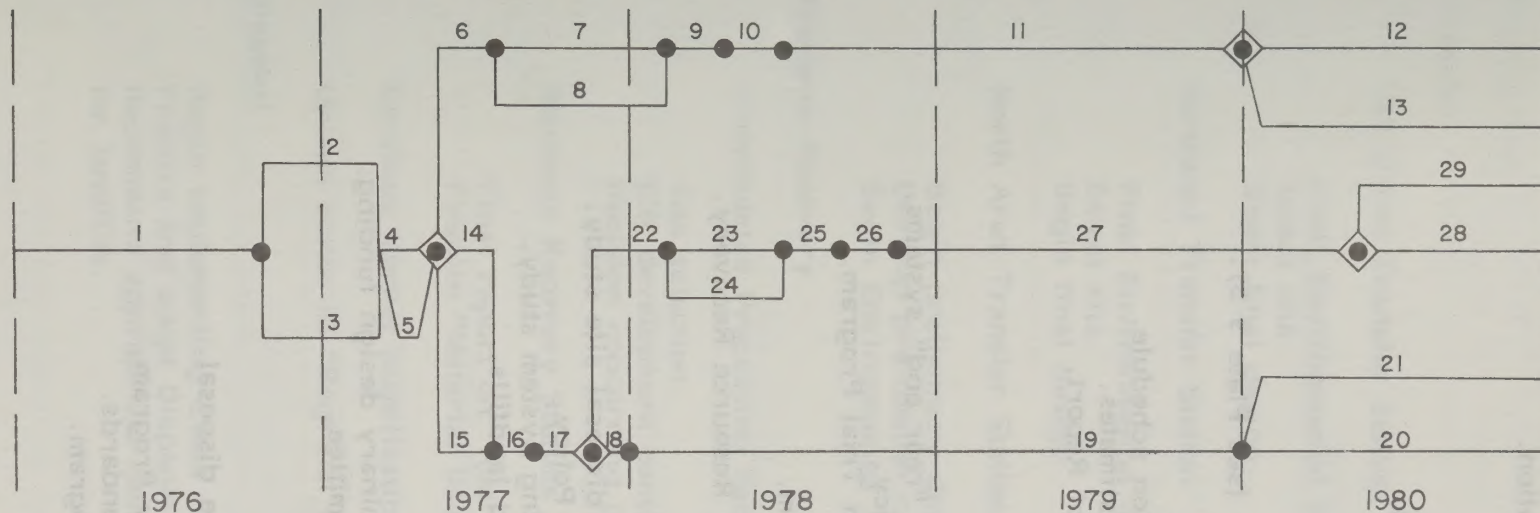
Transfer

Elk Grove Transfer Station.

- Begin preliminary design.
- Develop pre-design cost estimates.
- Begin Environmental Impact Report.
- Begin site selection.

Northeast Transfer Station.

- Begin preliminary design.
- Develop pre-design cost estimates.
- Begin Environmental Impact Report.
- Begin site selection.



◆ DECISION POINT

IDENTIFICATION OF TASK NUMBERS

- | | | |
|--|---|--|
| 1. City And County Establish Preliminary Design Funding | 8. Obtain Bond And/Or Grant/Loan Approvals | 20. Private Sector Operates Facilities |
| 2. Conduct Preliminary Design And Select Site, Start EIR | 9. Advertise Bids | 21. Public Monitoring Of Operation |
| 3. County Seeks Material And Energy Market Commitments | 10. Award Contract | 22. Form JPA's Or NPC For Financing If Necessary |
| 4. Review Preliminary Design And Select Financing Approach, Submit Applications For Grant/Load Participation, Continue EIR | 11. Construction | 23. Prepare Final Design |
| 5. Determine Interest Of Private Sector | 12. Select Public Plant Operator | 24. Obtain Bond Authorization And/Or Grant/Loan Approval |
| 6. Form JPA | 13. Select Private Plant Operator | 25. Advertise Bids |
| 7. Prepare Final Design | 14. Establish JPA As Monitoring Authority | 26. Award Contract |
| | 15. Develop Request For Proposals | 27. Construction |
| | 16. Advertise Request For Proposals | 28. Select Private Plant Operator |
| | 17. Evaluate Proposals | 29. Select Public Plant Operator |
| | 18. Negotiate Contract | |
| | 19. Private Design And Construction Of Facilities | |

PLATE 9-5
IMPLEMENTATION SCHEDULE — PROCESSING STATION

SOURCE: BARTLE WELLS
ASSOCIATES

South Area Transfer Station.

Construct and begin operation.

Walnut Grove Transfer Station.

Finalize design and award.

Construct and operate.

Resource Recovery

Consolidated Processing Facility (see Plate 9-5).

Begin preliminary design.

Develop staging construction schedule.

Develop pre-design cost estimates.

Begin Environmental Impact Report.

Begin site selection.

Resource Recovery Studies.

Update state of the art on "rear end" systems.

Develop Materials Use Policy.

Implement Home Separation Trial Program.

Develop Market Stabilization Form.

Evaluate implications of regional Resource Recovery.

Disposal

Initiate and complete a Class III disposal site study.

Develop and adopt Disposal Site Policy.

Begin Gas and Leachate Monitoring System study.

Evaluate phased out of exhausted landfills.

Administrative

City and County establish preliminary design funding.

Select Solid Waste Planning Committee.

Special Projects

Begin policy development for tire disposal.

Begin Litter Control Program.

Begin Hazardous Waste Inventory Program.

Begin development of storage standards.

Implement ongoing inventory program.

1977

Review Plan

Transfer

Elk Grove Transfer Station

Final Environmental Impact Report.

Select site.

Begin final design.

Northeast Transfer Station

Final Environmental Impact Report.

Select site.

Begin final design.

North Area Transfer Station

Begin preliminary design for expansion.

Develop pre-design cost estimates.

Begin Environmental Impact Report.

Resource Recovery

Consolidated Processing Facility (see Plate 9-5).

Site selection.

EIR development continues.

Decision concerning public vs. private financing.

Resource Recovery Studies

Final report on "Rear End Systems for Sacramento County."

Finalize "Material Use Policy for Sacramento County."

Continue Market Stabilization Program development.

Update status of "Regional Resource Recovery."

Disposal

Begin implementing Class III site development.

Finalize and adopt Disposal Site Policy.

Recommend appropriate monitoring systems for gas and leachate and for landfills.

Administrative

Variable depending on decisions made during the year. See Plate 9-5.
Planning Committee underway.

Special Projects

Recommend Tire Disposal Program.
Recommend Hazardous Waste Program.
Complete and adopt storage standard development - Begin enforcement.

1978

Review Plan

Transfer

Elk Grove Transfer Station.

Complete final design.
Bid and award contract for construction.

Northeast Transfer Station.

Complete final design.
Bid and award contract for construction.

North Area Transfer Station.

Final EIR.
Final design for expansion.

Resource Recovery

Consolidated Processing Facility (see Plate

Resource Recovery Studies

Update report on "Rear End Systems for Sacramento County."
Update Materials Use Policy.
Complete Market Stabilization program.
Prepare report on existing resource recovery programs and recommend action.

Establish written response from surrounding areas concerning
Regional Resource Recovery.

Disposal

- Begin operation of Class III landfill.
- Update Disposal Site Policy.
- Install appropriate monitoring systems for gas and leachate.

Administrative

- Finalize contract form for "Joint Powers Agreement."

Special Projects

- Implement Tire Disposal Program.
- Implement Hazardous Waste Program.

1979

- Rewrite Plan as required.

Transfer

- Elk Grove Transfer Station.

 - Construct and begin operation.

- Northeast Transfer Station.

 - Construct and begin operation.

- North Area Transfer Station.

 - Bid, award and construct.

Resource Recovery

- Consolidated Processing Facility (see Plate 9-5).

- Resource Recovery studies.

 - Update report on "Rear End System for Sacramento County."
 - Update Materials Use Policy.
 - Prepare Market Stabilization program for implementation.
 - Implement recommended resource recovery programs.

 - Recommend activity concerning Regional Resource Recovery.

Disposal

- Prepare updated report on adequacy of disposal facilities in Sacramento County
- Update Disposal Site Policy

Administrative

See Plate 9-5.

1980-1990 (Medium Term)

Annually Review Plan

Transfer

Prepare annual report on transfer station efficiency.

Disposal

Prepare annual report on disposal site adequacy.

Resource Recovery (see Plate 9-5).

Complete construction on complete Front End System.

Implement "Rear End System" if one is found economically feasible.

Prepare Annual Report on Resource Recovery.

Administrative

Coordinate Countywide activities.

Collection

Evaluate technology for potential benefit to County.

Replace and upgrade equipment in all facilities.

1990-2000 (Long Term)

Annually Review Plan.

Replace and upgrade equipment in all facilities.

FINANCING ANALYSIS

The consolidated processing financing program would be implemented in two parts which are:

- o Gate fees for transfer and disposal facilities would finance all design, construction, and operation of new and existing transfer stations. In addition, gate fees would finance the special programs listed in Table 8-1. The capital for construction will come from reserves and interfund borrowing.

- o *The City of Sacramento and the County will jointly finance the processing station. As a first step, these two entities would levy on themselves a disposal surcharge on all municipal waste to finance the costs of preliminary design, estimated at \$200,000. The City of Sacramento and the County will, after preliminary design, explore public and private financing alternatives.*

These two administrative units can be thought of as enterprises. The remaining financing analyses will examine revenues and expenses for each enterprise.

Transfer and Disposal Enterprise

Table 9-4 shows the cost of all programs to be financed from gate fees for disposal and transfer. The costs have three parts. Part one consists of the special programs proposed to improve solid waste management in the County. Part two consists of the design and construction of recommended transfer stations. Part three consists of the operating costs of all transfer and disposal facilities. Table 9-4 shows actual costs, not amortized, in 1975 dollars.

Uniform Gate Fees - Gate fees at the small transfer stations present special financing problems. Some of the small transfer stations have high unit costs. Gate fees reflecting the full unit costs at these stations would encourage illegal dumping.

Gate fees at transfer stations also affect the haul patterns in the County. As the gate fees at transfer stations increase, more people will drive directly to low gate fee landfills. A large differential between gate fees at transfer stations and landfills would completely discourage the use of transfer stations.

The financial analysis assumes that gate fees at the transfer stations and at the County landfill will be the same. This uniform gate fee has several advantages. A uniform gate fee is the most direct method of subsidizing high cost transfer stations. It is easy to administer because it

TABLE 9-4
EXPENSES FOR DISPOSAL AND
TRANSFER ENTERPRISE (\$000)¹

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85
Special Programs²										
Waste inventory	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0
Disposal site policy	5.0	5.0	--	--	--	--	--	--	--	--
Gas & leachate monitoring	5.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Final use at landfills	--	5.0	--	--	--	--	--	--	--	--
Close completed landfills	--	--	5.0	--	--	--	--	--	--	--
Class III disposal study	--	10.0	--	--	--	--	--	--	--	--
Litter control	--	5.0	--	--	--	--	--	--	--	--
Separate collection of recyclables	--	20.0	--	--	--	--	--	--	--	--
Efficiency of collection	--	--	10.0	--	--	--	--	--	--	--
Materials use and reuse	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Hazardous waste inventory	--	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Scrap tire study	--	--	10.0	--	--	--	--	--	--	--
Total	\$ 25.0	\$ 90.0	\$ 60.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0
Design and Construction										
North area expansion		\$ 20.0 ³	\$ 500.0 ⁴	\$ -- ⁴						
Northeast station		40.0 ³	20.0 ³	1,495.0 ⁴						
South area station		--	--	--						
Elk Grove station		--	20.0 ³	500.0 ⁴						
Walnut Grove station		--	--	--						
Total		\$ 60.0	\$ 540.0	\$1,995.0						
Operations^{5,6}										
Disposal	\$ 603.6	\$ 659.1	\$ 669.9	\$ 696.8	\$ 833.3	\$ 844.6	\$ 856.1	\$ 867.8	\$ 879.6	\$ 891.6
North area station	786.8	797.5	808.4	819.4	830.5	841.9	853.3	864.9	876.7	888.7
Northeast station	--	--	--	--	635.2	647.0	659.1	671.4	683.7	696.6
South area station	--	375.5	377.2	378.7	581.7	587.8	593.7	599.9	606.1	612.2
Elk Grove station	--	--	--	78.4	160.0	163.9	167.9	172.1	176.3	180.5
Walnut Grove station	--	60.9	61.1	61.8	61.4	61.6	61.6	61.9	61.9	62.1
Total	\$1,390.4	\$1,893.0	\$1,916.6	\$2,035.1	\$3,102.1	\$3,146.5	\$3,191.7	\$3,238.0	\$3,284.3	\$3,331.7

¹ - All costs in 1975 dollars.

² - Special programs shown on Plate 8-1, described in Chapter 8.

³ - Design cost.

⁴ - Construction cost.

⁵ - All operations costs include depreciation to fund capital replacement.

⁶ - Increases in operation costs reflect increased waste flows only--no inflation.

removes the worry of adjusting differential gate fees at transfer stations and landfills. Also, a uniform gate fee will, in effect, consolidate the revenue flows of transfer and disposal, thus creating a strong revenue history for future support of the processing station.

Uniform gate fees will encourage greater use of transfer stations by, in effect, creating a subsidy from landfill operations. This subsidy will provide greater public convenience in disposing of waste and should, thus, lower illegal dumping.

Revenues and Expenses - Table 9-5 contains cash flow projections for the revenues and expenses of the transfer and disposal enterprises to 1984/85.

The projection is based on waste flows to transfer stations and the landfill operated by the SWMD. After 1979/80, the flows include waste from the City of Sacramento.

Between 1976-77 and 1978-79 some deficits for design and construction of the transfer stations will occur. These deficits are too small to justify the expense of a bond issue. They could be met with interfund borrowing from the County. Any loans from the County would be repaid by 1984-85.

Table 9- 5 does not account for inflation. All costs are in 1975 dollars. Inflation is discussed in a later section.

Processing Station Enterprise

The processing station would be designed and built by a JPA. Plate 9-5 shows the implementation schedule. The schedule has three important stages, which are:

- o Preliminary design - market surveys, site selection, and equipment specification.*
- o Construction - either publicly or privately financed.*
- o Operations - either public or private.*

TABLE 9-5
CASH FLOW FOR TRANSFER AND
DISPOSAL ENTERPRISE¹

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85
Waste Flows ² (000 tons)	363.5	396.9	403.4	419.6	580.1	588.0	596.0	604.2	612.4	620.8
Charge per ton	\$3.90	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00	\$6.00.
Expenses (\$000) ³										
Special programs	\$ 25.0	\$ 90.0	\$ 60.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0
Design & construction	--	60.0	540.0	1,995.0	--	--	--	--	--	--
Operations	1,390.4	1,893.0	1,916.6	2,035.1	3,102.1	3,146.5	3,191.7	3,238.0	3,284.4	3,331.7
Total	\$1,415.4	\$2,043.0	\$2,516.6	\$4,065.1	\$3,137.1	\$3,181.5	\$3,226.7	\$3,273.0	\$3,319.4	\$3,366.7
Revenues (\$000)										
Gate fees	\$1,417.7	\$2,381.4	\$2,420.4	\$2,517.6	\$3,480.6	\$3,529.8	\$3,576.0	\$3,625.2	\$3,674.4	\$3,724.8
Carryover ⁴	--	2.3	340.3	244.1	--	--	--	--	89.9	474.9
Total	\$1,417.7	\$2,383.7	\$2,760.7	\$2,761.7	\$3,480.6	\$3,529.8	\$3,576.0	\$3,625.2	\$3,764.3	\$4,169.7
Net revenues (deficit) (\$000)	\$ 2.3	\$ 340.7	\$ 244.1	(\$1,303.4) ⁵	--	--	--	\$ 89.9	\$ 444.9	\$ 808.0
Repayments to County (\$000) ⁶	--	--	--	--	\$ 343.5	\$ 348.3	\$ 349.3	262.3	--	--

1 - All costs in 1975 dollars.

2 - After 1979/80, waste flows include City of Sacramento.

3 - Summary of Table 9.

4 - Carryover from previous year's surplus.

5 - Deficit is covered with interfund loan from County.

6 - Repayments on loan reflect no interest.

The financing analysis presented in this chapter shows bonds, revenues and expenses under public financing and operation. Private financing and operation would be very similar. This presentation is not a recommendation for public financing, only an example of what costs are likely to be.

Table 9-6 shows the revenue bond issue necessary to finance construction of the proposed processing station. The bond issue is estimated at \$20 million to fund \$15.3 million of design and construction costs. The bond issue establishes a reserve fund of \$2 million, 10 percent of the issue, as a security to bond buyers. The bond issue also funds about \$3.8 million of interest that will not have to be paid from gate fees at the processing station. Earnings on deposits during construction allow the bond issue to be reduced to \$20 million.

Table 9-7 shows the cash flow for the processing enterprise with public financing. To 1976-99 the only expense is the \$200,000 for preliminary design. This amount is funded from contributions from the City of Sacramento and the County, based on a \$.20 disposal surcharge on waste handled by these two entities.

The enterprise does not levy a gate fee in 1977-78 during the period when the city and county are deciding on public or private financing. After 1977-78, a gate fee of \$3.70 is necessary to cover all expenses and to provide a necessary bond coverage of 1.4. Table 9-7 shows no revenues from the sale of recovered materials for the first two years of operation. If revenues from recovered materials did occur, the enterprise could reduce gate fees.

The \$3.70 gate fee for processing would be in addition to gate fees levied by the transfer and disposal enterprise.

Summary of Gate Fees & Service Charges

Table 9-8 summarizes the gate fees for both enterprises in each area of

TABLE 9-6
REVENUE BOND ISSUE FOR
MATERIALS RECOVERY STATION

Construction costs ^{1,2}	\$13,900,000
Design costs ³	1,390,000
Funded interest ⁴	3,750,000
Reserve Fund ⁵	2,000,000
Issuance costs ⁶	120,000
Earnings ⁷	<u>(1,160,000)</u>
Total ⁸	<u>\$20,000,000</u>

1 - 1975 dollars.

2 - Expended over 18 month construction period.

3 - Payable immediately out of bond issue.

4 - Funded during construction and for one full year of operation.

5 - 10 percent of issue.

6 - .6 percent of issue.

7 - Earnings on deposit at 8 percent per year.

8 - 20 years at 7.5 percent.

TABLE 9-7
CASH FLOW FOR PROCESSING STATION ENTERPRISE¹

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85
Waste Flows² (000 tons)										
City	139.6	140.6	141.7	142.8	143.9	145.3	146.7	148.7	149.7	151.2
County	363.5	396.9	403.4	419.6	436.1	442.7	449.3	456.0	462.7	469.1
Total	503.1	537.5	545.1	562.4	580.1	588.0	596.0	604.2	612.4	620.8
Charge per ton³	\$.20 ⁴	\$.20 ⁴	\$ --	\$3.70 ⁴	\$3.70 ⁴	\$3.70	\$3.70	\$3.70	\$3.70	\$3.70
Revenues (\$000)										
Charges										
City	\$ 27.9	\$ 28.1		\$ 528.4	\$ 531.3	\$ 537.6	\$ 542.8	\$ 548.3	\$ 553.9	\$ 559.4
County	72.7	74.0		1,552.5	1,613.9	1,638.0	1,662.4	1,687.2	1,712.0	1,737.5
Sale of materials ⁵	--	--		--	--	--	1,249.2	2,532.7	2,567.0	2,602.2
Total	\$ 100.6	\$ 102.1		\$2,080.9	\$2,145.2	\$2,175.6	\$3,454.4	\$4,768.2	\$4,832.9	\$4,899.1
Expenses (\$000)										
Preliminary design		\$ 200.0			\$ -- ⁷	\$ --	\$ --	\$ --	\$ --	\$ --
Bond service ⁶		--			--	980.9	1,961.8	1,961.8	1,961.8	1,961.8
Transport ⁸		--			70.3	140.6	140.6	140.6	140.6	140.6
Operations ⁹		--			870.9	1,776.5	1,812.1	1,848.3	1,885.3	1,923.0
Total		\$ 200.0			\$ 941.2	\$2,898.0	\$3,914.5	\$3,950.7	\$3,987.7	\$4,025.4
Net revenues (deficit)	\$ 100.6	\$ --	\$ --	\$2,080.9	\$1,204.0	\$ (722.4)	\$ (460.1)	\$ 817.5	\$ 845.2	\$ 873.7
Fund balance ¹⁰	100.6	2.7	2.9	4,083.8	5,412.8	4,851.8	4,535.2	5,504.8	6,560.3	7,707.6

1 - All costs in 1975 dollars.

2 - Waste flows to city and county enterprise only.

3 - Charge for processing only. Allows bond coverage of 1.4 in 1982/83.

4 - Prior to operation of station, this charge is levied separately by city and county.

5 - Based on \$31.05 per ton of recovered material. No revenues shown for first two years of operation.

6 - Based on \$20 million bond issue at 7.5 percent for 20 years.

7 - First year of interest funded from bond proceeds.

8 - Based on eight-year lease at 10 percent.

9 - Operations increase at 2 percent per year.

10 - Fund earns 6 percent per year on minimum balance.

11 - Includes bond funded reserves of \$2.0 million.

TABLE 9-8

SUMMARY OF GATE FEES FOR TRANSFER,
DISPOSAL, AND PROCESSING (\$/TON)¹

Service Area	1976-79			1979-85		
	Transfer & Disposal	Processing	Total	Transfer & Disposal	Processing	Total
A. City of Sacramento ²	\$1.20	\$.20	\$1.40	\$6.00	\$3.70	\$9.70
B. North area of County	6.00	.20	6.20	6.00	3.70	9.70
C. City of Folsom	6.00	.20	6.20	6.00	3.70	9.70
D. Independent Disposal Company ²	4.00	--	4.00	6.00	3.70	9.70
E. Camarillo Sanitary Service	6.00	.20	6.20	6.00	3.70	9.70
F. Delta Refuse Service	6.00	.20	6.20	6.00	3.70	9.70

1 - All costs in 1975 dollars.

2 - Equivalent gate fees--no charge actually levied.

the County. The gate fees for transfer and disposal apply only to facilities presently operated by the SWMD. The gate fee for processing applies to facilities presently operated by the SWMD and the City of Sacramento.

Tables 9-9 and 9-10 summarize the impact of the gate fees for the two enterprises on service charges to a single-family dwelling. The analysis of impact is similar to that of Chapter 8. Table 9-9 assumes no change in the cost of collection service throughout the period to 1985. All costs are presented in 1975 dollars.

Inflation. All costs presented up to this time have been in 1975 dollars to allow realistic comparison with existing costs. To meet actual cash flow needs, however, inflation must be considered. Therefore, this section examines the effect of inflation on gate fees.

Inflation will cause annual increases in costs. These annual increases can be met in one of two ways: raise gate fees annually, or raise gate fees only periodically to anticipate inflation. Raising gate fees periodically would allow surpluses to accumulate in the first part of a period to cover inflation-caused deficits in the last part of the period.

Table 9-11 shows both annual and three year average gate fees to 1984-85 assuming a seven percent annual inflation. The average gate fees are weighted averages based on waste flows.

Effect of Grants. State or federal grants for the processing station would allow some reduction in the bond issue. This reduction in bond issue would effect bond service payments only, not operation costs.

A 50 percent grant would allow reduction of the bond issue to one-half of its projected amount. Bond service would be reduced from \$1,961,800 to \$980,900. With the same 1.4 bond coverage used in Appendix J rates with this 50 percent grant could be reduced from \$3.70 per ton to \$1.40

TABLE 9-9
IMPACT OF GATE FEES AND DIFFERENT,¹
DISPOSAL POINTS ON SERVICE CHARGES

Service Area	Current System ²			Processing and Transfer 1976-79				Processing and Transfer 1980-85			
	Total \$/Ton	Haul \$/Ton	Disposal \$/Ton	Total \$/Ton	Haul \$/Ton	Disposal \$/Ton	Percent Change	Total \$/Ton	Haul \$/Ton	Disposal \$/Ton	Percent Change
A City of Sacramento	\$37.49	\$ 5.30	\$ 1.20	\$37.69	\$ 5.30	\$ 1.40	1%	\$45.79	\$ 5.30	\$ 9.70	22%
B North area of County	36.71	6.50	2.28	39.91	5.78	6.20	9	40.33	2.70	9.70	10
C City of Folsom	35.56	8.80	1.50	40.26	8.80	6.20	13	39.09	4.13	9.70	10
D Independent Disposal Co.	24.81	4.90	4.00	27.01	4.90	6.20	9	30.51	4.90	9.70	23
E Camarillo Sanitary Service	35.40	12.03	4.00	28.24	3.67	6.20	-20	31.74	3.67	9.70	-10
F Delta Refuse Service	18.63	3.94	4.00	24.24	7.35	6.20	30	27.74	7.35	9.70	49

¹ - All costs in 1975 dollars.

² - Estimates of costs are in Chapter 6.

TABLE 9-10

ESTIMATED SERVICE CHARGES WITH
TRANSFER AND PROCESSING

	Service Area	Current \$/Month	1976-79 \$/Month	1980-85 \$/Month
A	City of Sacramento	\$4.00	\$4.05	\$4.90
B	North area of County	4.00	4.40	4.40
C	City of Folsom	4.75	5.40	5.25
D	Independent Disposal Co.	3.25	3.55	4.00
E	Camarillo Sanitary Service	4.74	3.80	4.30
F	Delta Refuse Service	2.50	3.25	3.75

TABLE 9-11
GATE FEES WITH INFLATION¹

			1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85
A	City of Sacramento ²	Annual Average	\$1.40	\$1.50	\$1.60	\$1.75	\$12.70	\$13.60	\$14.60	\$15.60	\$16.70	\$17.85
				-----1.60-----				-----13.75-----			-----16.85-----	
B	North area of County	Annual Average	3.90 ³	6.65	7.10	7.60	12.70	13.60	14.60	15.60	16.70	17.85
				-----7.30-----				-----13.75-----			-----16.85-----	
C	City of Folsom	Annual Average	1.50	6.65	7.10	7.60	12.70	13.60	14.60	15.60	16.70	17.85
				-----7.30-----				-----13.75-----			-----16.85-----	
D	Independent Disposal Company	Annual Average	4.00	4.30	4.60	4.90	12.70	13.60	14.60	15.60	16.70	17.85
				-----4.70-----				-----13.75-----			-----16.85-----	
E	Camarillo Refuse Service	Annual Average	4.00	6.65	7.10	7.60	12.70	13.60	14.60	15.60	16.70	17.85
				-----7.30-----				-----13.75-----			-----16.85-----	
F	Delta Refuse Service	Annual Average	4.00	6.65	7.10	7.60	12.70	13.60	14.60	15.60	16.70	17.85
				-----7.30-----				-----13.75-----			-----16.85-----	

1 - Based on 7 percent annual inflation.

2 - Equivalent gate fees--no charge actually levied.

3 - Average disposal charge for entire area.

per ton. Larger grants would permit even greater reductions in gate fees. If the processing station received an 80 percent grant, the station could, assuming that the projections for revenues from recovered materials are met, charge no gate fee in its third year of operation. A gate fee would probably be necessary in the first two years of operation to cover costs until markets for recovered material are established.

The Final Plan

This chapter, which also appears in the draft plan, outlines the final plan for the station, including the final design, construction schedule, and other implementation details. The chapter also outlines the revenue projections for the station. It should be noted that the station is not yet authorized for operation by the State and Federal governments, and the station is not yet authorized for operation by the State and Federal governments.

Proposed Station

The station is located in the proposed area. There are

1. Project design and construction
2. Project design and construction
3. Project design and construction
4. Project design and construction
5. Project design and construction
6. Project design and construction
7. Project design and construction
8. Project design and construction

Chapter 10

The Final Plan

This chapter, written after review of the draft plan, contains the final planned actions, implementation, J.P.A cash flow, miscellaneous program statements, and plan implementation schedule. The chapter represents the consensus of reactions to the draft plan. It should, thus, be viewed as the plan ready for adoption by the Cities and Counties, whereas previous chapters serve as background.

PLANNED ACTIONS

The planned actions are in nine program areas. These are:

- o *Disposal standard and surveillance.*
- o *Ongoing planning and coordination.*
- o *Special waste management.*
- o *Group 2 landfills.*
- o *City landfill replacement.*
- o *Transfer stations.*

- o Processing.
- o Energy recovery.
- o Miscellaneous program statements.

Action by many different public agencies as well as by private industry is required to accomplish the many tasks and projects recommended in this plan. The following general division of responsibility among public agencies and private industry is made to arrive at recommended objectives.

- o *County Department of Community Health* - This department will be the enforcing agency for state and local solid waste health standards.
- o *Solid Waste Management Division (SWMD)* - Sacramento County's public works department will enforce Solid Waste Management operating standards in the unincorporated area. They will design, and construct transfer facilities as well as conduct special studies to improve planning in solid waste management. The SWMD will be responsible for periodically updating the plan until such time as the joint powers authority is formed. The SWMD will provide coordination of litter and hazardous waste program as well as regulation of private industry collection in the unincorporated areas.
- o *The Cities* - The Cities will retain responsibility for SWM operating standards in their jurisdictions and will retain control over city collection.
- o *The solid waste planning committee* - A solid waste planning committee will be designated by the Board of Supervisors and the Cities as an advisory committee on solid waste management. The committee will have representatives from the County, the Cities, private industry and citizens.
- o *Joint powers agency* - A County-wide joint powers agency will administer and operate transfer, disposal, and recovery facilities. This authority will guarantee the flow of waste and regulate gate fees at all disposal sites. This authority may finance and operate resource recovery facilities if private industry is unable to do so.
- o *Private industry* - Private industry operates many solid waste facilities in the County. It will have a substantial voice in the solid waste planning committee. It will be provided the opportunity to construct and operate facilities.

The sections below make specific assignments in each program area.

Disposal Standards and Surveillance

State Minimum Standards - Standards for disposal are one part of the State's minimum standard for handling and disposal of solid waste (Title 14, Division 7, Chapter 3 of California Administrative Code). The standards are of two types: health standards, solid waste management (SWM) standards.

The state standards require that a local Enforcement Agency be designated to enforce the general operation and regulation standards. In addition, the standards say:

"It is the intent (of the standards) that the local health entity is the Enforcement Agency for Health Standards."
(Section 17208)

The Plan - Table 10-1 summarizes the administrative and operational activities needed to implement programs for enforcing state disposal standards. The Cities, and the Board of Supervisors will designate the County Department of Community Health as the enforcing agency for health standards.

Enforcement of operating standards is divided among the Cities and the County. The Solid Waste Management Division (SWMD) of the County Public Works Department will be the enforcing agency for SWM operations in the unincorporated areas. Each city will retain this responsibility within its own jurisdiction. The state shall be the enforcement agency when state standards apply which prevent local agencies from enforcing their own operations.

Funding of the Department of Community Health's budget from the general fund will continue. Activities for enforcement of service standards will be funded from the enterprise revenues of the SWMD, the City of Sacramento's Waste Removal Division (WRD), regulatory fees and fines.

TABLE 10-1

ENFORCE DISPOSAL STANDARDS AND MAINTAIN SURVEILLANCE

Major Activity	Responsible Entity	Operational Plan	Financial Source
Enforce Health Standards	The County Department of Community Health will retain responsibility for enforcing health standards.	The department will use existing staff and inspection procedures.	The department will rely on existing financing from the general fund.
Enforce Operations Standards	The SWMD will monitor and enforce state mandated SWM operations standards in the unincorporated area. The cities will enforce operational standards within their own jurisdictions.	The County, through the JPA, will consider several programs to meet state standards. These are listed in Plate 10-2.	The JPA will finance special programs and increased standards from transfer and landfill gate fees. The City and County of Sacramento will finance enforcement standards from enterprise revenues.
Pollution Control at Landfills	Primary-Regional Water Quality Control Board (RWQCB) will coordinate on county level with the SWMD.	No new programs.	The RWQCB may wish to contract with the SWMD to monitor landfills to meet state requirements.
Litter Control Program	The SWMD will, with the cooperation of the County Department of Community Health develop a litter control program.	The study is estimated at \$10,000 and will be conducted in 1976 and 1977.	Financing for the study will come from transfer and landfill gate fees of the County's solid waste disposal system.

The plan also provides that the SWMD, in conjunction with the County Department of Community Health, jointly develop a litter control program and hazardous waste control program.

Special Programs - To aid in the enforcement of State minimum standards for disposal as well as to improve County-wide solid waste management, several special studies related to disposal standards and surveillance are planned. Table 10-2 lists these special programs. Because these programs are County-wide in their applicability, they are assigned to the Joint Powers Authority.

Ongoing Planning and Coordination

Table 10-3 shows the administrative and operational activities needed to implement programs for ongoing planning and coordination.

In the plan for ongoing planning and coordination the Solid Waste Planning Committee plays the major role in public information and policy review.

Storage and Collection

State minimum standards for storage and collection may also be divided into health standards and service standards, in a manner similar to disposal standards. Health standards are now enforced by the County Department of Community Health in both incorporated and unincorporated areas. This arrangement will continue.

Among local service standards are such operational issues as point of collection, mandatory collection, franchise and permit conditions, and ability to direct waste flows. These issues will be resolved by the Cities by jurisdiction and by the County for the unincorporated area.

Table 10-4 contains the administrative and operational activities needed to implement the storage and collection program.

TABLE 10-2
SPECIAL PROGRAMS RELATING TO DISPOSAL
STANDARDS AND SURVEILLANCE

COST	TIME	STUDY DESCRIPTION
\$5,000	1 Year	Develop and implement ongoing waste inventory systems County-wide.
\$30,000	1 Year	Land disposal studies 1. Establish overall disposal site policy. 2. Develop gas and leachate monitoring system at landfills. 3. Develop ultimate land use policy at completed landfills. 4. Phase out unneeded or exhausted landfills. 5. Class III disposal site study.

Source: Staff

TABLE 10-3

ONGOING PLANNING AND COORDINATION

Major Activity	Responsible Entity	Operational Plan	Financial Source
Publicize Plan	The Solid Waste Planning Committee will serve as a forum for publicizing the plan.	The Planning Committee will hold public meetings and issue press releases	Staff support for the committee will come from operational departments.
Plan Review and Monitoring	The JPA through the Solid Waste Planning Committee.	The committee will review any revisions to the plan and make recommendations to the JPA.	Future plan revisions should be funded by the JPA through the application of fees at disposal sites.

TABLE 10-4
STORAGE AND COLLECTION

Major Activity	Responsible Entity	Operational Plan	Financial Source
Enforce Service Standards	The SWMD will enforce service standards in unincorporated areas. Each city will enforce service standards in its own jurisdiction.	New County ordinance already approved. The SWMD administers the ordinance and regulatory program.	Inspection of commercial collection vehicles funded through collection truck permit fees and from disposal charges.
		Each city is required to establish its own enforcement capability or contract with the County.	Cities will finance enforcement of operation standards as desired.
Enforce Health	The County Department of Community Health will continue enforcing health standards in both incorporated and unincorporated areas.	The department will enforce County Solid Waste Ordinance and City health standards.	Department funded from general fund.

Special Waste Management

The plan contains several special waste studies to improve monitoring and disposal of special wastes. Table 10-5 contains the administrative and operational activities needed to implement special waste management programs.

Class 2 Landfills

At the projected rates of waste production, the estimated lives of existing disposal sites are as follows:

<u>Disposal Site</u>	<u>Estimated landfill closing date</u>	<u>Years Remaining</u>
City of Sacramento landfill	1980+	5+
Kiefer Boulevard	2000	25
Walden landfill (Group 3 Waste Only)	1976	1
Grand Island	1976	1
Elk Grove	1977	2

Long term planning requires that waste flows to landfills be monitored. Monitoring is necessary to plan the size of energy recovery facilities and to identify long-term landfill capacity needs. This is required by State standards. The JPA will monitor waste flows to landfills. Table 10-6 contains the administrative and operational activities needed to implement Class 2 landfills.

Landfill use also requires timely closure of landfills when completed. As seen in Table 10-6, the Solid Waste Planning Committee is designated by the Cities and the County as the advisory committee to establish completion dates for landfills. This committee will review and recommend final use plans for completed sites to the JPA. Finally, the committee should receive applications and recommend to the JPA action on land use permits for any new landfills which may be developed.

TABLE 10-5
SPECIAL WASTE MANAGEMENT

Major Activity	Responsible Entity	Operational Plan	Financial Source
Group I Waste Monitoring	The JPA will monitor group I waste flows. The State Water Control Board has primary responsibility for regulating group I waste.	The JPA will develop a hazardous waste monitoring program in 1977. Cost Estimates \$10,000.	The SWMD will solicit support from the State Water Quality Control Board. Remaining funding will come from disposal site fees.
Group III Waste	The JPA will identify new group III sites to replace the Waldon landfill.	The study will be conducted in 1977. Cost estimates \$10,000.	Funding for the study will come from disposal charges.
Scrap Tires	The JPA will study the scrap tires disposal problem and make recommendations for action.	The JPA will study the tire disposal problem in 1976. Cost estimates \$10,000.	Funding for the study from the JPA disposal and transfer site fees.

TABLE 10-6
CLASS 2 LANDFILLS

Major Activity	Responsible Entity	Operational Plan	Financial Source
Landfill Use Program	The JPA will negotiate capacities of landfills and recommend to the City and County completion rates for existing landfills.	The SWMD and the city Waste Removal Division will provide technical support to the JPA.	Support studies funded from JPA revenues.
Final Use Program	The JPA through its Solid Waste Planning Committee will recommend final use for closing sites.	Same as above.	Same as above.
New Landfills	The JPA through its Solid Waste Planning Committee will recommend action on land use permits for new landfills.	Same as above.	Same as above.

City Landfill Replacement

The City of Sacramento landfill is scheduled to close in 1982. Several possible replacement disposal systems have been identified in Chapter 7 but none can be recommended at this time. Among the possible replacement facilities are:

- o A new landfill.*
- o Direct haul to remote landfill.*
- o The proposed south area and existing north area transfer stations.*
- o A city transfer station.*
- o A consolidated processing station.*

Because no one alternative emerged as preferred, further study is recommended. This study will be conducted by the Joint Powers Authority to provide a County-wide vantage point and to allow the replacement system to be placed optimally within the disposal network.

Once a replacement facility is identified, some thought must be given to capital financing. Previous discussions in Chapter 8 and 9 indicate that the cost of a city transfer station may be as high as \$2.5 million in 1980.

Of the capital financing alternatives discussed in Chapter 8, capital accumulation, or pay-as-you-go financing is probably the best method of financing a city landfill replacement facility. Such a facility would be unlikely to generate voter enthusiasm for a bond authorization. Non-voted debt may not be worth the high interest costs. Capital accumulation, if planned for, can provide the most straightforward financing method.

Table 10-7 summarizes the administrative and operational activities needed for providing a city landfill replacement. The JPA is the major actor in

TABLE 10-7
CITY LANDFILL REPLACEMENT

Major Activity	Responsible Entity	Operational Plan	Financial Source
Study replacement alternatives.	The JPA will study alternatives.	Study should be conducted upon JPA formation.	Funds can come from gate fees levied on county disposal activities.
Establish capital accumulation funds.	The JPA will establish contribution amounts to the fund.	Capital accumulation should begin as soon as possible.	Same as above.
Construct facility.	The JPA will manage construction.	Construction to be completed by 1982.	Capital accumulation and any short term inter-fund borrowing or revenue sharing allocations.
Operate facility.	The JPA will manage operations.	Public or private enterprise may operate facilities.	Gate fees.

solving this problem with funding to come from gate fees levied on the County-wide transfer and disposal system. The JPA should establish a target amount for construction of a facility as soon as possible and begin accumulating money from gate fees levied on the County-wide disposal system. Any construction cash flow deficits can be met with short term interfund borrowing from the City or County. The JPA should also manage operation of the facility. Either public enterprise or private enterprise under contract could operate the facility.

Transfer Stations

Plate 10-1 shows the basic planned transfer station system. This program includes the expansion of the existing north area station and construction of transfer stations to replace the Elk Grove landfill and the Grand Island landfill, both of which are closing.

Table 10-8 shows the capital costs of the proposed transfer station program.

A total of \$1,040,000 will be required for construction prior to 1980. In addition, \$1,117,500 has been appropriated from revenue sharing funds for transfer station projects currently being designed.

Table 10-9 shows the administrative and operational activities needed to complete the program of designing, constructing, and operating these three stations. The JPA will have primary responsibility for these stations. As in the case of the city landfill replacement, capital accumulation appears to be the best method of financing the remaining capital costs of these stations.

Processing Station

The Cities are not presently willing to commit themselves to any resource recovery program requiring public subsidy. For this reason, a full scale resource recovery feasibility study is necessary to precisely determine economics. A study during 1977 is planned to examine markets, financing

NORTH
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SCALE IN MILES

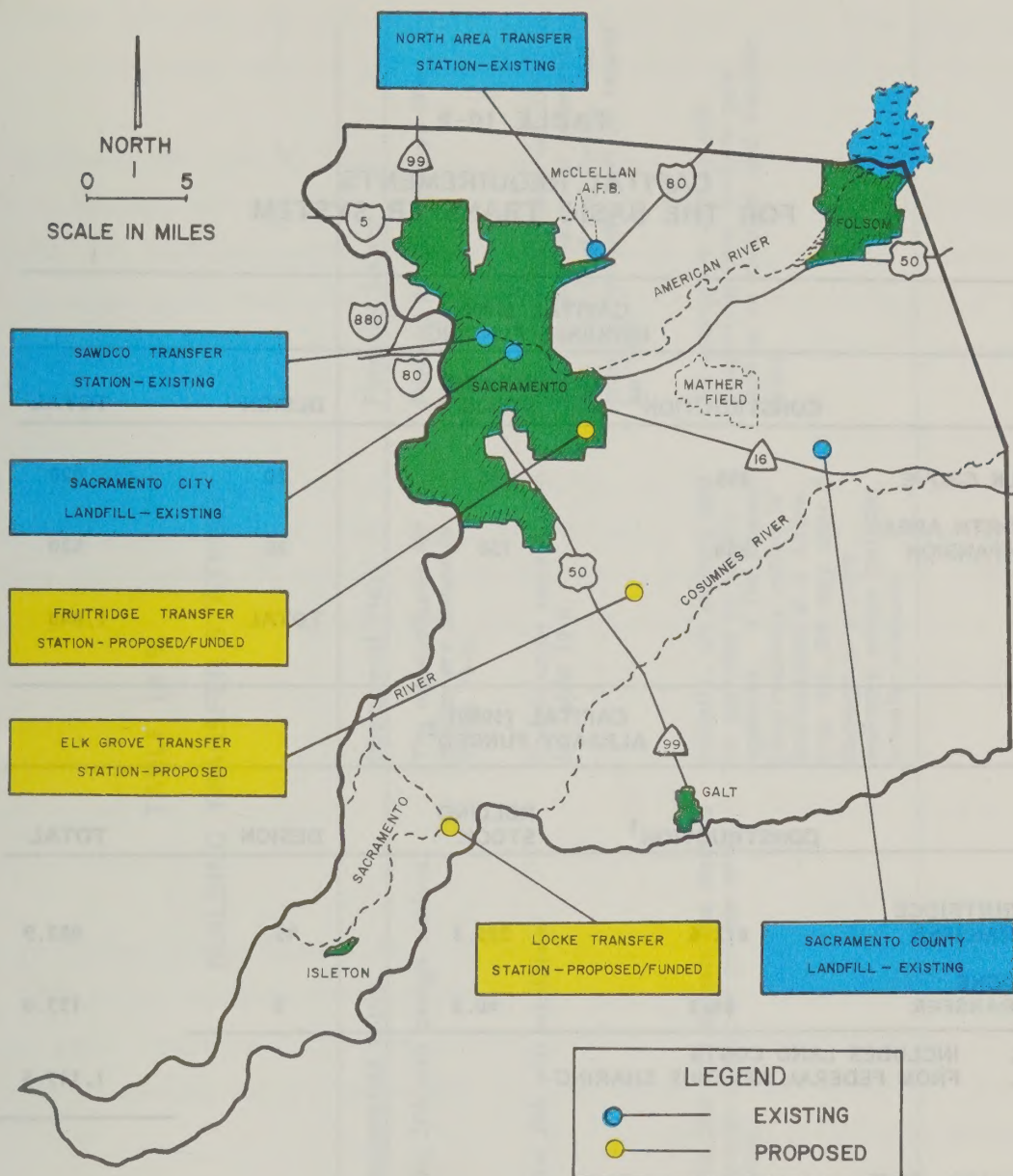


PLATE 10-1
BASIC TRANSFER SYSTEM

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

TABLE 10-8
CAPITAL REQUIREMENTS
FOR THE BASIC TRANSFER SYSTEM

CAPITAL (\$000) REQUIRES FUNDING				
	CONSTRUCTION ¹	ROLLING STOCK	DESIGN	TOTAL
ELK GROVE	355	145	20	520
NORTH AREA EXPANSION	350	150	20	520
			TOTAL	1,040
CAPITAL (\$000) ALREADY FUNDED ²				
	CONSTRUCTION ¹	ROLLING STOCK	DESIGN	TOTAL
FRUITRIDGE TRANSFER	612.6	326.3	45	983.9
LOCKE TRANSFER	84.3	40.3	9	133.6
1. INCLUDES LAND COSTS				
2. FROM FEDERAL REVENUE SHARING				1,117.5

Source: Staff

TABLE 10-9
BUILDING TRANSFER STATIONS

Major Activity	Responsible Entity	Operational Plan	Financial Source
Design	The JPA will design stations.	The expenditures for design are shown in Table 10-8.	Funding for design from JPA revenues.
Construction	The JPA will administer	Construction costs shown in Table 10-8.	The JPA will finance construction from a combination of reserves and Inter-fund borrowing. All construction costs will be repaid by 1985.
Operation	The JPA will operate the stations through public or private enterprise.	Initially, all stations will be operated by public agencies. If the processing/recovery option is implemented at a future time the JPA may offer a package to private industry which includes transfer stations.	All operations will be self-supporting from uniform gate fees at all disposal and transfer sites.

and technology in detail to determine the extent and timing of processing. The study will also, if so indicated, select a site and prepare specifications for the facility suitable for circulation to private enterprise.

The JPA is designated to conduct this study and manage the eventual construction and operation of a facility. The JPA has the option of public or private financing and operation. Table 10-10 summarizes the administrative and operational activities needed to implement this first stage in resource recovery.

Energy Recovery

The plan provides for an on-going energy recovery study. The purpose of the study would be to establish the most desirable long-term energy markets that can be satisfied by technology proven in commercial application and to evaluate technologies. The JPA has primary responsibility for this evaluation.

Table 10-11 summarizes the administrative activities needed to complete the energy recovery plan.

IMPLEMENTATION

Implementation of the recommended actions will require the formation of policymaking bodies, budgeting for planning and establishing capital accumulation targets. The process will involve policymakers from the County and from the Cities as well as staff cooperation among various existing operating entities.

Joint Powers Authority Formation

The primary implementing vehicle for most of the major actions proposed by the plan is the JPA. Formation procedures for JPA's are very flexible and are described in detail in Chapter 8. The participants must negotiate a contract establishing the policy-making and operating procedures of the JPA. The following plan provides for JPA formation negotiations.

TABLE 10-10
BUILDING PROCESSING STATION

Major Activity	Responsible Entity	Operational Plan	Financial Source
Feasibility Study	The JPA will conduct a joint preliminary design and site selection with market survey. JPA to make decision on future course of processing facilities.	The JPA will administer the study in 1977.	The study will be funded from JPA gate fees at disposal and transfer activities.
Build Station	The JPA will administer construction of the station.	<u>Private</u> - With acceptable private proposals the JPA will let a construction and operation contract to private enterprise.	<u>Private</u> - Any acceptable financing source.
		<u>Public</u> - With no acceptable private proposal or with a grant contingent on public operation, the JPA will build the station.	<u>Public</u> - 1941 Act Revenue Bonds supported by gate fees.
Operation Station	JPA will administer station. It will review rates and guarantee waste flows.	The station can be publicly or privately operated.	Gate fees will be used to support all operations.

TABLE 10-11

ENERGY RECOVERY PLANNING

Major Activity	Responsible Entity	Operational Plan	Financial Source
Ongoing evaluation	The JPA will administer market and technology evaluations to determine best energy markets and technology. JPA to make decision on future course of energy recovery.	This evaluation will be conducted periodically.	The study will be financed by the JPA from transfer and disposal gate fees.

Negotiation Cost - The Cities and the County approach the JPA negotiation with a general understanding of the issues to be discussed; however, some entity must be assigned the responsibility for initiating discussion. The County Public Works Department will be designated responsibility for initiating discussion and taking the lead, in cooperation with the City Engineer, to develop a contract for the formation of the JPA. All entities should prepare to devote some staff expense to the negotiation. The participants may wish to hire a consultant to assist in defining issues and to draft discussion material.

Both the City of Sacramento and County should be prepared to devote at least \$5,000 of staff time to the negotiation process. An additional \$5,000 should be adequate to cover any consultant and legal fees.

Finally, the entities will want legal counsel to draft the final agreements.

Representation - The County-wide JPA will provide appropriate representation to the participating entities. Both the City of Sacramento and Sacramento County will have preponderate representation on the JPA's board. The Cities of Folsom, Isleton and Galt will also have representation. For a five-man board the following representation is suggested: 2 Supervisors, 2 City of Sacramento Councilmen, 1 Councilman from either Folsom, Isleton, or Galt.

Program Coordination - Most of the actions recommended in the plan will require cooperation among City and County staffs. Some of the studies will require joint study groups, or will require the hiring of consultants. The JPA will designate a solid waste program coordinator to draw together all of the various programs of the JPA into one budget. This budget may specify services of City and County staffs as well as services of any private firm.

Once the JPA board approves the budget, it can be forwarded to the City Councils and Board of Supervisors for final approval. This arrangement, in effect, would mean that the JPA would be purchasing staff services from the Cities and the County.

Policymaking Authority - The JPA's single most important policymaking tool will be an independent budget funded from a County-wide disposal and transfer enterprise. Such an independent enterprise will allow the JPA to purchase City and/or County services as needed to fund operations, special studies, and capital accumulation.

Financial self-sufficiency is the key to successful program management. Solid waste management will be paid entirely from charges on the solid waste system. No tax support will be necessary.

The County and the City of Sacramento have several alternatives for providing the JPA with revenues from the solid waste disposal and transfer system. They could turn gate fees over to the JPA as contributions. Or, they could actually transfer ownership of the facilities to the JPA and allow the JPA to levy its own charges. A middle ground would be for the County and City to simply agree to allow the JPA full power to set gate fees on the facilities sufficient to pay all operating expenses, special program, and capital costs.

Operations - Several planned actions specifically allow the JPA the option for public or private operation of facilities.

The JPA will request proposals from the private sector to compare with public operation of any project. The operational issue will not be so much public versus private but which specific enterprise does the most efficient work on a specific project.

Directing Waste Flows - Some regulatory powers, while required by the JPA to accomplish its functions, will be exercised by the Cities or the

County. The power to direct waste flows is one such power. For resource recovery, the JPA may require both publically and privately collected waste flows for economical operation. This may necessitate that wastes which would otherwise be taken to private disposal points, be directed to the JPA resource recovery system. Such regulatory power will be exercised by City Councils and the Board of Supervisors at the request of the JPA.

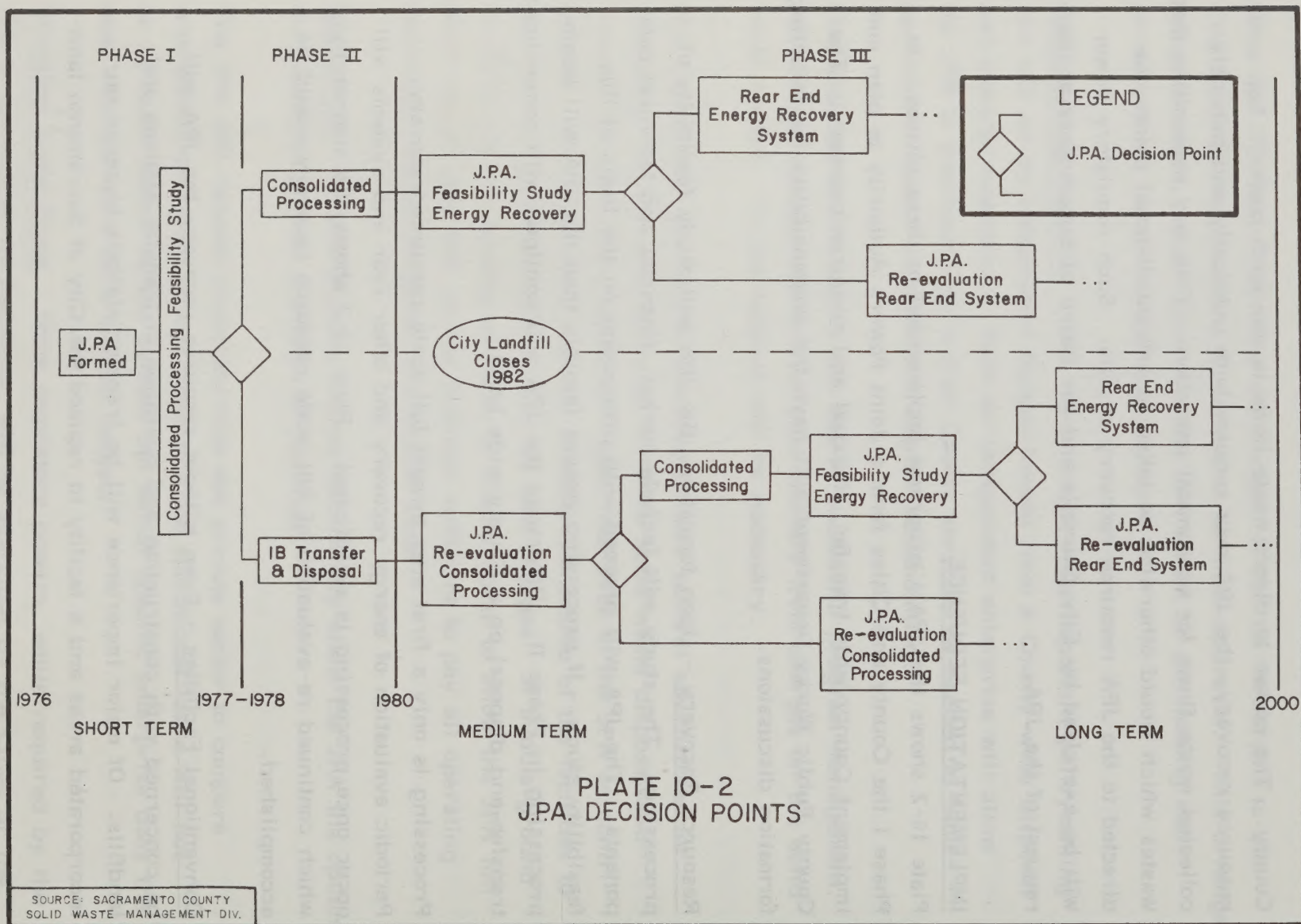
IMPLEMENTATION SEQUENCE

Plate 10-2 shows the JPA's programs implemented in three phases. In Phase I the County and Cities form a Joint Powers Authority to plan and implement County-wide transfer, disposal and resource recovery. The County Public Works Department will have the responsibility for initiating formation discussions.

Resource Recovery - Upon formation, the JPA will study feasibility of processing. The study will include market, financial and technical components. The JPA will proceed with processing on the basis of this feasibility study. If processing proves feasible then the JPA will begin processing in Phase II. Otherwise the JPA will continue with conventional transfer and disposal on a County-wide basis.

Processing is only a first step toward full scale resource recovery. Periodic evaluation of energy recovery and other rear end systems will occur once processing is established. Plate 10-2 shows the manner by which continued re-evaluation of full scale resource recovery would be accomplished.

Conventional Facilities - Even without resource recovery the JPA will be concerned with construction and operation of transfer stations and landfills. Of major importance will be transfer stations to serve unincorporated areas and a facility to replace the City of Sacramento land-



fill. Planning for replacement facilities for the City landfill will occur immediately upon formation of the JPA.

CASH FLOW OF THE JPA 1976-1982

Table 10-12 summarizes the expenses for County-wide disposal and transfer. These include all special programs described in Tables 10-1 to 10-11 as well as construction and operation costs of proposed and existing facilities. Included in construction costs is a City landfill replacement estimated at \$2.5 million in 1981/82.

Table 10-13 shows the effect of these expenses on average gate fees. The table shows that a \$5.75 average gate fee would be adequate to cover all operation, capital accumulation, and special program costs to 1982. The table does not include the capital cost of a processing station. A possible cash flow for such a station is shown in Chapter 9.

The \$5.75 shown in Table 10-13 is an average gate fee only. The plan does not preclude setting different gate fees at landfills and transfer stations.

MISCELLANEOUS PROGRAM STATEMENTS

There are a number of activities of low economic impact which must be conducted in the near term to upgrade the solid waste management system and to begin the activities for implementation of resource recovery programs. These activities are listed below as program intent statements.

- o *The County and cities will propose and/or support legislation at the state level to regulate non-returnable containers, either through prohibition, tax, or deposit.*
- o *The County and cities will propose and/or support public education programs at the state level aimed at source reduction.*
- o *The County and cities will take the initiative in developing local control and educational programs which will serve to*

TABLE 10-12
EXPENSES FOR COUNTYWIDE DISPOSAL
AND TRANSFER (\$000)¹

	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
<u>Special Programs</u> ³						
Waste inventory	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0	\$ 5.0
Disposal site policy	5.0	--	--	--	--	--
Gas & leachate monitoring	10.0	5.0	5.0	5.0	5.0	5.0
Final use at landfills	5.0	--	--	--	--	--
Close completed landfills	--	5.0	--	--	--	--
Class III disposal study	10.0	--	--	--	--	--
Litter control	10.0	--	--	--	--	--
Separate collection of recyclables	20.0	--	--	--	--	--
Efficiency of collection	--	10.0	--	--	--	--
Materials used and reuse	20.0	20.0	20.0	20.0	20.0	20.0
Hazardous waste inventory	5.0	5.0	5.0	5.0	5.0	5.0
Scrap tire study	--	10.0	--	--	--	--
Total	\$ 95.0	\$ 60.0	\$ 35.0	\$ 35.0	\$ 35.0	\$ 35.0
<u>Design and Construction</u>						
North area expansion	\$ 20.0 ⁴	\$ 500.0 ⁵	\$ --	\$ --	\$ --	\$ --
City replacement facility	--	--	--	--	--	2,500.0 ^{4,5}
South area station	--	--	--	--	--	--
Elk Grove station	--	20.0 ⁴	500.0 ⁵	--	--	--
Walnut Grove station	--	--	--	--	--	--
Total	\$ 60.0	\$ 520.0	\$ 500.0	--	--	\$2,500.0
<u>Operations</u> ^{6,7}						
Disposal - City Landfill	\$ 84.4	\$ 170.0	\$ 171.4	\$ 172.7	\$ 174.4	\$ 176.0
County Landfill	297.6	605.1	629.6	654.3	664.1	674.1
North area station	398.8	808.4	819.4	830.5	841.9	853.3
South area station	187.8	377.2	378.8	380.4	382.0	383.7
Elk Grove station	--	--	78.4	160.0	163.9	167.9
Locke station	30.5	61.1	61.8	61.4	61.6	61.6
Total	\$ 999.1	\$2,021.8	\$2,139.4	\$2,259.3	\$2,287.9	\$2,316.6

1 - All costs in 1975 dollars.

2 - Assumes operation from January 1977.

3 - Special programs described in Tables 10-1 to 10-11.

4 - Design cost.

5 - Construction cost.

6 - All operations costs include depreciation to fund capital replacement.

7 - Increases in operation costs reflect increased waste flows only--no inflation.

TABLE 10-13

SUMMARY OF CASH FOR FORMATION, OPERATIONS, CAPITAL ACCUMULATION
AND SPECIAL STUDIES OF JOINT POWERS AUTHORITY¹ (\$000)

	1976/77 ²	1977/78	1978/79	1979/80	1980/81	1981/82
Wasteflow (Total City and County)	168.8	545.1	562.4	580.1	588.0	596.0
Gate Fee ³	5.75	5.75	5.75	5.75	5.75	5.75
<u>REVENUES</u>						
Gate Fees	1,545.6	3,134.3	3,233.8	3,335.6	3,381.0	3,427.0
<u>EXPENSES</u>						
Negotiation	10	-	-	-	-	-
City Landfill Replacement Study	25	-	-	-	-	-
Processing Feasibility Study	200	-	-	-	-	-
Ongoing Energy Recovery Study	-	5	5	5	5	5
Special Programs (Table 10-12)	95	60	35	35	35	35
Design and Construction (Table 10-12)	60	520	500	-	-	2,500
Operations (Table 10-12) ⁵	<u>1,031.1</u> <u>1,421.1</u>	<u>2,086.6</u> <u>2,671.6</u>	<u>2,206.5</u> <u>2,746.5</u>	<u>2,639.6</u> <u>2,679.6</u>	<u>2,673.9</u> <u>2,713.9</u>	<u>2,708.6</u> <u>5,213.6</u>
<u>ACCUMULATION FUND</u>						
Net Revenues (debit)	124.5	462.7	487.3	656.0	667.1	(1,786.6)
Capital Accumulation ⁴	124.5	595.9	1,124.9	1,859.6	2,656.9	870.3

1 - All costs in 1975 dollars

2 - Assumes operation from January 1977

3 - Average gate fee - not meant to preclude differential rates at different facilities

4 - Capital accumulation fund earns 7% on minimum balance

5 - Assumes JPA operates all landfills and transfer stations

Source: Staff and Bartle Wells

solve Countywide solid waste management problems and help to conserve material and energy resources and foster community support.

- o The County and cities will develop a plan for the ultimate land use for all sanitary landfills, both existing and proposed. This plan will be based on a near term study to be conducted by the Countywide JPA.
- o The County and cities are committed to the principle of resource recovery and will investigate the various levels of activity which may result in the improvement of this program area. In this regard the County will conduct a "home separation of recyclable materials" study in a near term.
- o The County and cities recognize disposal as a high priority area of concern; thus, the J.P.A. will conduct the following activities in the near term:
 - a. Establish guidelines and policy for all disposal operations.
 - b. Study Class I, II and Class III disposal site potential and needs Countywide.
 - c. Develop gas and leachate monitoring systems at all long term County and city landfills.
 - d. Develop a land reclamation plan for the entire County for the purpose of providing adequate Class III disposal capability and returning blighted land to productive use.
 - e. Develop an orderly plan for the redistribution of wastes which will be necessitated as various landfills become exhausted or are closed for other reasons.
- o The County and cities generally recognize the need for mandated collection service on a Countywide basis.
- o The County and cities will propose and/or support such measures which will guarantee the effective and efficient operation of public and private solid waste activities; this may include owner mandated collection service and tax lien procedures for recovering delinquent monies.
- o The County and cities are committed to developing uniform exemption procedures to assure fair treatment of private citizens in regard to any mandated activities. The County will study this area of concern and develop guidelines in the near term.

- o The County and cities fully recognize the need to regulate private solid waste handling activities in the County and the need for information concerning solid waste quantities and movement for the purpose of future planning.
- o The County and cities are concerned about the lack of knowledge as to the type, quantities, and movement of hazardous waste thus a monitoring program will be developed in the near term.
- o The County and cities recognize the state mandate to provide effective litter and hazardous waste control activities. The County and cities believe that their current litter and hazardous waste program meets state requirements, but the County will study this area and propose necessary action in the near term.
- o The County and cities will adopt state solid waste standards and will formulate and implement in ordinance form local standards regarding solid waste generation, storage, collection, transfer, transport, processing, and/or recovery in the near term.
- o The County and cities are committed to community and interdisciplinary participation in the planning stages of solid waste management activities; thus, the County and cities will organize citizen and technical input committees.
- o The County and cities recognize the need to consider regional solutions to solid waste management problems; thus, where a multi-jurisdictional or regional approach to a solid waste problem is shown to be advantageous to the County and cities, it will be adopted.
- o The County and cities recognize the need for well organized, comprehensive ordinances and see a need for coordination in this regard between the cities and the County. The County will pursue this matter in the near term.

PLAN IMPLEMENTATION SCHEDULE

Plate 10-2 displays the basic format for policy decisions which will occur over the next 24 years. In addition to the major programs which will develop as a consequence of decisions shown on Plate 10-2 are a number of specific actions which will occur as described in the following implementation schedule. These specific actions are presented

in summary form by functional activity and during the year in which programs are to begin.

1976

Adopt Plan

Administrative

Form Countywide JPA

Select solid waste planning committee

Transfer

Elk Grove Transfer Station

Begin preliminary design

Develop pre-design cost estimates

Begin Environmental Impact Report

Begin site selection

South Area Transfer Station

Construct and begin operation

Locke Transfer Station

Finalize design and award

Construct and operate

Resource Recovery

Consolidated Processing

JPA begins detailed feasibility study for consolidated processing

Resource Recovery Studies

Update state of the art for resource recovery systems

Begin development of Materials Use Policy

Implement Home Separation trial program for unincorporated area

Begin development of Market Stabilization Form

Disposal

Initiate and complete a Class III disposal site study

Develop and adopt Disposal Site Policy

Begin Gas and Leachate Monitoring system study

Evaluate phased out or exhausted landfills

Special Projects

Begin policy development for tire disposal

Begin litter control program

Begin Hazardous Waste inventory program

Begin development of storage standards

Implement ongoing inventory program

1977

Review Plan

Administrative

Variable depending on decisions made during the year

JPA to begin operating landfill and transfer station

Transfer

Elk Grove Transfer Station

Final Environmental Impact Report

Select site

Begin final design

North Area Transfer Station

Begin preliminary design for expansion

Develop pre-design cost estimates

Begin Environmental Impact Report

Resource Recovery

*Consolidated Processing

JPA finishes resource recovery feasibility study and makes decision concerning consolidated processing

Resource Recovery Studies

Report on resource recovery systems for Sacramento County

Finalize Material Use Policy for Sacramento County

Continue Market Stabilization Program development

Update status of "Regional Resource Recovery"

Disposal

Begin implementing Class III site development

Finalize and adopt Disposal Site Policy

Recommend appropriate monitoring systems for Gas and Leachate and landfills

Special Projects

Recommended tire disposal program

Recommended Hazardous Waste program

Complete and adopt storage standard development - Begin enforcement

1978

Review Plan

Transfer

Elk Grove Transfer Station

Complete final design

Bid and award contract for construction

* Implementation of Consolidated Processing would follow the schedule detailed in Chapter 9

North Area Transfer Station

Final EIR

Final design for expansion

Resource Recovery

Consolidated Processing

Continue with JPA recommended program

Resource Recovery Studies

Update report on "Rear End Systems for Sacramento County"

Update Materials Use Policy

Complete Market Stabilization program

Update report on resource recovery programs

Establish written response from surrounding areas concerning Regional Resource Recovery

Disposal

Begin operation of Class III landfill

Update Disposal Site Policy

Install appropriate monitoring systems for Gas and Leachate

Special Projects

Implement Tire Disposal Program

Implement Hazardous Waste Program

1979

Rewrite Plan as required

Transfer

Elk Grove Transfer Station

Construct and begin operation

North Area Transfer Station Expansion

Bid, award and construct

Resource Recovery

Consolidated Processing

Continue with JPA recommendations

Resource Recovery Studies

Update report on "Rear End Systems for Sacramento County"

Update Materials Use Policy

Prepare Market Stabilization program for implementation

Implement recommended resource recovery programs

Recommend activity concerning Regional Resource Recovery

Disposal

Prepare updated report on adequacy of disposal facilities in Sacramento County

Update Disposal Site Policy

1980 - 1990 (Medium Term)

Annually Review Plan

Administrative

JPA Coordinates Countywide activities

Transfer

Prepare annual report on transfer station efficiency

Disposal

Prepare annual report on disposal site adequacy

Resource Recovery

Implement JPA recommended programs

Prepare Annual Report on Resource Recovery

Collection

Evaluate technology for potential benefit to County

Replace and upgrade equipment in all facilities

1990 - 2000 (Long Term)

Annually Review Plan

Replace and upgrade equipment in all facilities

Environmental Assessment

INTRODUCTION

In its broadest sense, the environment includes natural, physical, social, and economic factors. The Department County Solid Waste Management Plan is designed to ensure the achievement of these environmental goals and, in fact, the assessment was based on the impact of environmental consequences of particular activities. The purpose of this chapter is to detail the process by which specific portions of the plan which, in combination, comprise an environmental impact report as required by the California Environmental Quality Act. In addition, this chapter summarizes the environmental assessment.

The assessment will show that the assessment is made in general terms for the proposed plan is comprehensive. That is, it provides specific categories of projects or activities which have been identified which have not been in the past with any precision. Projects proposed for implementation under the proposed plan will be evaluated as they are designed.

Chapter 11

Environmental Assessment

INTRODUCTION

In its broadest (and most realistic) sense, the environment includes natural, physical, social, and economic factors. The Sacramento County Solid Waste Management Plan is directed toward the attainment of basic environmental goals and, in fact, its development was based on the assessment of environmental consequences of perceived alternatives. The purpose of this chapter is to direct the reviewer to those specific portions of the plan which, in combination, comprise an environmental impact report as required by the California Environmental Quality Act. In addition, this chapter summarizes the environmental assessment.

The reviewer will note that the assessment is made in general terms as the proposed plan is conceptual; that is, it proposes specific categories of projects to accommodate identified needs but does not attempt to locate them with any precision. Projects proposed for implementation under the proposed plan will be evaluated as they are designed

for environmental effects. If found to be potentially significant, an EIR will be prepared.

Table 11-1 keys appropriate areas of the plan which meet CEQA's requirements.

Analysis of Environmental Impacts

Environmental analysis is essentially the prediction of impacts of perceived alternatives, one of which necessarily is "no action." By comparing the anticipated effects, it is presumed the best alternative will be defined as that which will (1) have the least environmental effect, and, by inverse reason, (2) optimize efficiencies. Obviously, the two are interrelated. Frequently, unavoidable adverse effects will be identified. This identification process permits the design of measures to reduce these effects insofar as is possible.

For purposes of organization, this assessment will be reported at two levels -- the overall effect of the plan and potential effects of implementation. Chapter 3, Planning Area Characteristics, summarizes the base of the analysis.

Policy Level Impacts

The Solid Waste Management Plan, Chapter 10, recommends a number of policy statements. In general, these statements specify more detailed study and planning in a number of areas. Based on identified deficiencies in the existing solid waste management system, these statements would in all cases result in beneficial impacts on the environment.

Implementation Level Impacts

Non-program aspects of the plan include the following: eight major facilities including four transfer stations, one consolidated processing facility or transfer station and two landfills. A potential future arrangement would have collected wastes directed to the transfer stations and

TABLE 11-1
CEQA REQUIREMENTS

Project Description	Chapter 1: Introduction & Methodology Chapter 2: Summary of Findings & Recommendations
	Chapter 10: The Final Plan
Environmental Setting	Chapter 3: Planning Area Character- istics
Alternatives	Chapter 7: Facility and Administra- tion Alternatives
Public Policy	Chapter 1: Planning, Scope, Logistics, and Methodology

thence to a consolidated processing station. From there, residual wastes would be taken to one of two existing landfills. The following is an analysis of the effects of projects on various elements of the physical environment.

Atmospheric Quality. Currently the vast majority of collected wastes are hauled directly to landfill sites. Small compactor trucks are required to make trips of considerable length in reaching one of the existing landfill sites. The proposed project would enable wastes from lower capacity vehicles to be transferred to larger capacity vehicles which would result in lower waste-tonnage-miles travelled. This would have a beneficial impact on regional air quality. However, increased traffic could substantially increase localized carbon monoxide levels in the immediate vicinity of the transfer station sites.

Another adverse effect could result in terms of odors emanating from wastes. The consolidated processing facility, if constructed, could result in a variety of air pollutants. These cannot be quantified until processes are specifically designed.

Several general mitigating measures can be provided to guide the evolution of the plan in regard to specific projects. These are:

1. Careful consideration of existing and future waste generation rates (as may be determined by land use plans) in locating specific transfer stations and the consolidated processing facility to minimize waste tonnage miles.
2. Locating transfer stations in areas which can absorb increased traffic without resulting in congestion.
3. Locating transfer stations in areas where odors would not result in nuisances.
4. Designing access and egress routes to facilities in order that on-site congestion and vehicle running time will be minimized.

5. Full compliance with stationary source performance standards enforced by the County Air Pollution Control District.

Geologic and Soil Conditions. Potential adverse effects could occur if facilities are located on prime or potentially prime agricultural lands. This impact could be avoided by consideration of land capabilities.

Hydrologic Conditions. Several effects could result in terms of hydrologic considerations, these are (1) increased runoff, which would increase flood heights in receiving waters; (2) increased water consumption for washdown of facilities; and (3) adverse water quality effects from precipitation or washdown water carrying leachate from wastes.

Available mitigating measures include minimizing impervious surfaces to those absolutely necessary, providing on-site treatment and recycling of washdown water, intercepting leachate and providing treatment on-site or at discharge to sanitary sewers.

Plant and Animal Communities. The degree of adversity of impacts is dependent on specific site analyses. Environmental assessment during the selection process will identify impacts.

Historical Features. Site-specific assessments will be required to identify potential effects.

Land Use and Public Facilities. All facilities will be located and designed to meet land use requirements, zoning laws, and general community plan guidelines; thus, no significant impacts are anticipated.

The proposed facilities would generate traffic which would alter and be affected by existing traffic conditions on access roads to the sites. The sites will be designed to account for existing traffic patterns, potential traffic growth and pattern changes, and accommodation of vehicles without

queuing on access streets. Therefore, no significant traffic movement impacts are anticipated. Additional demands will be placed on drainage and sewerage facilities.

Aesthetic and Nuisance Conditions. The facilities will not possess any outstanding visual features. By their nature, disposal facilities carry a certain stigma which may be considered adverse, particularly when in proximity to residential land uses. In this regard the facilities would create adverse impacts. This will be minimized, however, through screening techniques utilizing landscaping or other means and generally avoiding sites where the projects would be incompatible with existing or planned land uses.

Several nuisance-related impacts have been investigated in other sections of this report. These include the potential occurrence of odors and traffic.

To assess the impact of the proposed facilities on ambient noise levels, limited sampling was conducted at a transfer station in Sacramento County's north area. Existing noise levels at the North Area Transfer Station vary depending on the activity, but could not be described as significant. Adverse effects would be avoided as proposed above under visual considerations.

Demographic and Housing Characteristics. The proposed facilities would not affect housing or demographic characteristics of the community.

Economic Conditions. A financial analysis of the recommended facilities is presented in Chapter 10. The following areas are discussed:

- Expenses for Disposal & Transfer

- Cash Flow for Disposal & Transfer

- Implementation Schedule

- Bond Issue for Processing Station

Cash Flow for Processing Station

Summary of Gate Fees

Impacts of Gate Fees on Service Charges

Estimated Service Charges

Effects of Inflation on Gate Fees

Analysis and justification for transfer facilities are shown in Appendix D.

Major financial impacts include increased disposal gate fees and collection service charges. Customers of large transfer stations and the disposal site will be subsidizing the smaller sites if all transfer station charges are equalized throughout the County.

SUMMARY OF IMPACTS AND THEIR DISPOSITION

Adverse Environmental Effects Which Cannot Be Avoided if the Recommended Plan is Implemented.

1. The proposed facilities will adversely affect air quality in the vicinity of their sites in terms of increased carbon monoxide concentrations. The impact could be near significant in relationship to Federal Ambient Air Quality Standards, unless mitigation measures are included.
2. Traffic would increase on roadways leading to the facilities, but not significantly.
3. The proposed solid waste system will cost more to operate than the existing system.

Irreversible Environmental Changes Which Would Be Involved in The Recommended Plan Should it be Implemented. Irreversible environmental changes would include the use of non-renewable resources for construction. The commitment of resources is not large, however, and thus irreversible impacts associated with the project are not considered significant.

Relationship Between Local Short Term Uses of Man's Environment and the Maintenance and Enhancement of Long Term Productivity. Adverse effects on air quality and noise at the neighborhood level are long-term

adverse impacts; a positive long-term air quality impact can be demonstrated in terms of area-wide air quality, in that the facilities would substantially lessen distances traveled for waste disposal. Additionally, a substantial long-term benefit in gasoline consumption would also accrue to the project.

The facilities will provide salvage and materials resource recovery (recycling). In addition to the convenience of waste disposal, some long-term health benefits may occur as refuse would probably not be accumulated at residences for prolonged periods.

The facilities are considered to be justified now because of the great distance residents must travel to dispose of their refuse, and because existing landfills utilized by municipal and commercial haulers are nearing the end of their "life".

Growth-Inducing Impact of the Proposed Action. The proposed facilities would not have any growth-inducing characteristics.

Mitigation Measures Proposed to Minimize the Impact. The following mitigation measures would serve to reduce adverse impacts identified in this report and are suggested by the preparers:

1. Air Quality.
 - a. The incorporation of design features which would expedite the flow of internal traffic, minimizing vehicle running time.
 - b. Prohibition of engine idling during dumping.
 - c. Signs along access roads suggesting engines be shut down when queuing occurs.
 - d. Shutdown of the transfer stations when adverse meteorological conditions exist.
 - e. The exploration of methods to induce air turbulence on the sites, thus increasing mixing. Possible measures would include the provisions of micro-relief features such as berms and landscaping.

2. Enhancement of the visual appearance of the facilities would reduce adverse impacts associated with human reactions to waste materials.
3. The provision of earthen berms along roads would reduce noise impacts to surrounding communities.
4. Equipping transfer vehicles with the most efficient noise muffling equipment possible would reduce peak noise intensity.
5. Sound suppression devices on shredders, buildings, and property associated with consolidated processing would buffer any anticipated noise problems

The programs of the plan are designed to increase efficiencies in waste mitigation measures in relation to the following:

1. reduced transportation-related energy expenditures;
2. reduced expenditures in conducting landfill operations;
3. the recovery of energy through waste processing; and
4. the conservation of energy through resource recovery.

Alternatives to the Proposed Actions

Alternatives to the Recommended Plan

- A. Alternatives are presented in Chapter 7. Chapter 8 discusses the financial impact of these alternatives in detail.

Alternatives to the Use of Transfer Stations

- A. Landfilling is the most commonly used method of disposal. Landfills vary from unsightly open dumps to strictly-managed sanitary landfills. When properly designed and managed, a sanitary landfill is the most desirable type of landfilling method known. A sanitary landfill located in the South Area, the Elk Grove Area, the Isleton Area, and the North Area would eliminate the need for transfer.

The greatest drawback to a landfill is the lack of community support for such activities, the unavailability of land, and leaching of dissolved solids to the ground water basin. See Appendix G.

- B. Incineration is the combustion of solid waste at high temperatures. This method reduces the volume of waste required for disposal but can produce air pollution problems. Incineration is used widely in the eastern United States but because of strict air-pollution control standards is becoming less prevalent.

Incineration construction and operation in the Sacramento area would be very expensive. The cost of operating a plant of 50-ton-per-day capacity (large enough to serve Elk Grove and Isleton) would exceed \$15.00 per ton. Some of this cost could be returned if the heat energy produced by incineration were used to generate electricity; however, an even greater capital cost would be required initially (see Alternative 2C). Further, incineration of many materials would be economically adverse in the long run as natural resources become depleted.

Alternatives to the Use of Consolidated Processing

- A. Resource Recovery and Processing. The consolidated processing arrangement proposed 100% processing of waste and 15% materials recovery by 1980. Salvage operations at the Kiefer Boulevard site and the North Area Transfer Station have demonstrated a market demand resulting in significant revenues. Such salvaging is not a substitute for a sanitary landfill or transfer facility; but combining recovery with transfer will provide an economical system as long as a high market demand exists. Market demand for recoverable materials, furthermore, is likely to increase with time as natural resources become depleted and their costs of primary production increase. See Appendix H.
- B. Home separation and Resource Recovery. See Appendix F.

"No Project" Alternative.

This alternative would maintain the status quo. Further investigation and

planning to resolve problems identified in the plan would not occur and existing problems would continue unabated.

Unavoidable impacts identified in this report would not occur. This alternative would result in a violation of state law.

Alternative Sites

Sites suitable for transfer stations are limited by a number of factors; among them are distance from population centers, land availability, and surrounding land uses.

Site selection techniques are shown in Appendix D. Specific sites for transfer stations will be determined on a project-by-project basis. The greatest community opposition is anticipated in locating the downtown area consolidated processing station.

ORGANIZATIONS AND PERSONS CONTACTED

See Chapter 1 and 5.

RELATED PUBLIC POLICIES, LAWS, AND REGULATIONS

See Chapter 3 and 5.

COMMENTS AND RESPONSES TO DRAFT EIR

See Appendix M.

BIBLIOGRAPHY

- Bay-Valley Consultants, 1974, Tentative - Recommended Water Quality Management Plan (Sac. River Basin, San Joaquin River Basin, Sacramento-San Joaquin Delta.
- California, State of, Air Resources Board, 1974, County, Bay Area & Regional Air Pollution Control Laws.
- California State Department of Public Health, 1973, Guidelines for Hazardous Waste Land Disposal Facilities.
- California State Department of Public Health - Vector Control Section, 1973, California Solid Waste Management 1973 Status.
- California State Resources Board, 1972, Implementation Plan For Achieving and Maintaining The National Ambient Air Quality Standards.
- Cardoza, Darryl, John Farrell & Mac Mailes, 1974, Draft: Sphere of Influence Report. LAFCO, Sacramento County.
- Colonna, Robert A., & Cynthia McLaren, Office of Solid Waste Management Programs, 1974, Decision-Making Guide in Solid Waste Management, U.S. Government Printing Office.
- Cor-Net, 1974, Metropolitan Service District Solid Waste Management Action Plan I, II, & III - Greater Portland Area, Oregon.
- Department of Health, U.S. Education & Welfare, A Study of Solid Waste Collection Systems Comparing One-Man With Multi-Man Crews, U.S. Government Printing Office.
- Department of Water Resources, 1974, Evaluation of Ground Water Resources: Sacramento County.
- Environmental Protection Agency, 1972, The State of CA Implementation Plan for Achieving & Maintaining the National Ambient Air Quality Standards.
- Environmental Protection Agency, 1974, Draft - Environmental Impact Statement Sacramento Regional Wastewater Management Program.
- Folsom City Code, Incorporated 1946, 1966.
- Galt City Code, Incorporated 1946.
- Gennis, Gray & Justice Engineers, 1974, Systems Study of Solid Wastes Collection - City of Sacramento.

- Housing Task Force, 1973, Sacramento Proposed City & County Housing Element.
- Lane Council of Governments, 1973, Preliminary Lane County Solid Waste Management Plan Parts A, B & C.
- Maxfield, Patrick L., Associate Civil Engineer, 1974, Feasibility Study County Wide Transfer Station Plan, May, 1974.
- Metcalf & Eddy, Inc., Engineers, New York Capital District Comprehensive Solid Waste Planning Study, Volume 1 & 2, Appendix.
- Metcalf & Eddy, Inc., Engineers, 1971, Solid Waste Management Plan for City & County of Honolulu.
- Morse, Norman, and Edwin W. Roth, Cornell Aeronautical Lab., Inc., 1970, Systems Analysis of Regional Solid Waste Handling, U.S. Government Printing Office.
- Office of Solid Waste Management Progress, 1973, Report to Congress - Disposal of Hazardous Wastes.
- Office of Solid Waste Management Programs, 1974, Second Report to Congress Resource Recovery and Source Reduction, U.S. Government Printing Office.
- Resources Agency - Air Resources Board, 1974, Air Pollution in CA, Annual Report 1973.
- Sacramento City Planning Department Staff, 1974, The Preliminary 1974 General Plan for Sacramento City.
- Sacramento County Health Agency, Department of Community Health Envir. Health Programs, 1974, Air Pollution Control District Rules & Regulations.
- Sacramento County Planning Department, 1973, Environmental Conservation and Resource Management Element of the Sacramento County General Plan.
- Sacramento County Planning Department, 1970, Commercial Areas Land in Use.
- Sacramento County Planning Department, 1962, Sacramento Perspective - An Analysis of the Sacramento Region.
- Sacramento County Planning Department, 1963, The Basic Physical Organization Plan for Sacramento County.

- Sacramento County Planning Department, 1967, A 1967 Supplement to the Galt General Plan.
- Sacramento County Planning Department, 1973, The City of Isleton General Plan.
- Sacramento County Planning Department, 1973, Environmental Conservation and Resource Management Element of the Sacramento County General Plan.
- Sacramento County Planning Department, 1972 and 1973, The Sacramento County General Plan.
- Sacramento Environmental Management Task Force, 1972, Sacramento County Environmental Studies - Vol. 1 & 2 - Sac. Co. Physical Environment.
- Sacramento Regional Area Planning Commission, 1973, Solid Waste Management Plan and Program Technical Reports - Vol. 2.
- Sacramento Regional Area Planning Commission, 1973, Regional General Plan Solid Waste Management and Program.
- Sacramento Regional Area Planning Commission, 1975, Draft - Regional Transportation Plan.
- Sacramento Regional Area Planning Commission, 1975, Draft - Envir. Impact Report Regional Transportation Plan.
- Sacramento Training & Recycling Action Program: A Feasibility Study, 1972.
- San Bernardino County, California, 1974, Solid Waste Management Master Plan for San Bernardino County, CA Final Report.
- Simpson, Stratta and Associates & Karl H. Baruth, 1967, City of Folsom - Sacramento County, California, General Plan 1985.
- Solid Waste Management Division, Sacramento, CA, 1973, Solid Waste Reclamation Study Phase I & II.
- State Solid Waste Management Board, 1974, Proceedings - Special Meeting of the State Solid Waste Management Board on Converting Solid Wastes into Energy.
- State Water Resources Control Board, 1974, Waste Discharge Requirements for Waste Disposal to Land Disposal Site Design & Operation Information.

State Water Resources Control Board, 1971, Water Quality Control Plan (Interim).

Yoder/Orlob Associates - Consulting Engineers, 1970, Solid Waste Management, Solano County.

SACRAMENTO COUNTY

SOLID WASTE

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APPENDICES

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SACRAMENTO COUNTY
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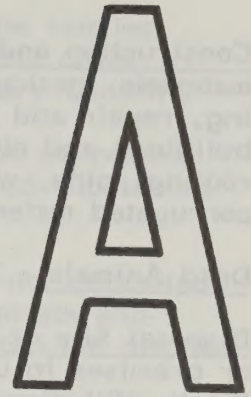
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Appendix



Glossary Of Terms

Abandoned Vehicles - include vehicles, with or without motor power, such as cars, trucks, trailers, mobilehomes, buses, etc., left on public or private property for an extended period of time and usually in an inoperable or hazardous condition.

Agricultural Solid Wastes - include wastes resulting from the production and processing of farm or agricultural products, including manures, prunings and crop residues wherever produced.

Bulky Waste - includes large items of solid waste such as appliances, furniture, large auto parts, trees, branches, stumps and other oversize wastes the large size of which precludes or complicates their handling by normal collection, processing or disposal methods.

Collection - the act of collecting solid waste at the place of waste generation by an approved collection agency (public or private); distinguished from "removal".

Collection Vehicle or Equipment - includes any vehicle or equipment used in the collection of residential refuse or commercial solid wastes.

Commercial Solid Wastes - include all types of solid waste generated by stores, offices and other commercial sources, excluding residences and excluding industrial wastes.

Construction and Demolition Wastes - include the waste building materials, packaging and rubble resulting from construction, remodeling, repair and demolition operations on pavements, houses, commercial buildings and other structures. These include items such as lumber, roofing, pipe, wire, insulation, broken concrete, plaster, paper and corrugated materials.

Dead Animals - include those animals whose carcasses require disposal.

Disposal Site or Sites - include the place, location, tract of land, area or premises in use, intended to be used, or which have been used for the landfill disposal of solid wastes.

Garbage - includes all kitchen and table food waste, and animal or vegetable waste that attends or results from the storage, preparation, cooking or handling of food stuffs.

Hazardous Wastes - include any waste materials or mixtures of wastes which are toxic, corrosive, flammable, an irritant, a strong sensitizer; which generate pressure through decomposition, heat or other means; if such a waste or mixture of wastes may cause substantial personal injury, serious illness or harm to humans, domestic animals or wildlife during, or as an approximate result of, any disposal of such wastes or mixture of wastes as defined in Article 2, Chapter 6.5, Section 25117 of the Health and Safety Code. The terms "toxic", "corrosive", "flammable", "irritant", and "strong sensitizer" shall be given the same meaning as in the California Hazardous Substances Act (Chapter 13, commencing with Section 28740 of Division 21 of the Health and Safety Code).

Industrial Wastes - include all types of solid wastes and semisolid wastes which result from industrial processes and manufacturing operations.

Infectious Wastes - include: (a) Equipment, instruments, utensils and other fomites of a disposable nature from the rooms of patients who are suspected to have or have been diagnosed as having a communicable disease and must, therefore, be isolated as required by public health agencies; (b) laboratory wastes, including pathological specimens (i.e., all tissues, specimens of blood elements, excreta and secretions obtained from patients or laboratory animals) and disposable fomites (any substance that may harbor or transmit pathogenic organisms) attendant thereto; (c) surgical operating room pathologic specimens, including recognizable anatomical parts, human tissue, anatomical human remains and disposable materials from hospitals, clinics, outpatient areas and emergency rooms, as are also defined in Section 314 (d) of the California Administrative Code, Title 17.

Landfill - means a disposal site employing a method of disposing of solid wastes on land, without creating nuisances or hazards to public health or safety, by utilizing principles of engineering to confine the

wastes to the smallest practical area, to reduce them to the smallest practical volume, and to cover them with a layer of suitable cover material at specific designated intervals. (See also Sanitary Landfill)

Leachate - includes liquid that has come in contact with or percolated through waste materials and contains extracted or dissolved substances therefrom.

Litter - includes any post-consumer solid waste which is not deposited in (1) an authorized solid waste disposal site, (2) appropriate and serviced storage containers or (3) in other areas designated for disposal of solid wastes.

Municipal Wastes - include residential, commercial, street collections and private citizens' wastes.

Processing - includes the reduction, separation, recovery, conversion or recycling of solid waste.

Private Citizens' Wastes - includes all residential wastes, except garbage, which the private citizen hauls directly to a point of disposal or transfer.

Refuse - includes garbage and rubbish.

Recycling - means the process by which salvaged materials become usable products.

Removal - means the act of taking solid wastes from the place of waste generation, either by an approved collection agent or by a person in control of the premises.

Residential Refuse - includes all types of domestic garbage and rubbish which originate in residential dwellings.

Resource Recovery - means the reclamation or salvage of wastes for reuse, conversion to energy or recycling.

Rubbish - includes non-putrescible solid wastes such as ashes, paper, cardboard, tin cans, yard clippings, wood, glass, bedding, crockery, plastics, rubber by-products or litter.

Salvaging - means the controlled removal of waste material for utilization.

Sanitary Landfill - means a disposal site employing an engineered method of disposing of solid wastes in a manner that minimizes environmental hazards by spreading, compacting to the smallest practical volume, and applying cover material over all exposed wastes at the end of each operating day. (See also Landfill)

Scavenging - means the uncontrolled and/or unauthorized removal of solid waste materials.

Septic Pumpings - include sewage solids from any facility which handles wastewater disposal by means of a septic tank rather than by hookup to a municipal sewer system.

Sewage Sludge - includes any residue, excluding grit or screenings, removed from waste water, whether such residue be in a dry, semidry or liquid form.

Shredding - includes a process of reducing the particle size of solid wastes through use of grinding, shredding, milling or rasping machines.

Solid Wastes or Wastes - include all putrescible and non-putrescible solid and semisolid wastes such as refuse, garbage, rubbish, paper, ashes, industrial wastes, demolitions and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, and vegetable or animal solid and semisolid wastes; and also include liquid wastes disposed of in conjunction with solid wastes at solid waste transfer/processing stations or disposal sites; but exclude: 1) Sewage collected and treated in a municipal or regional sewerage system, or 2) materials or substances having commercial value which have been salvaged for reuse, recycling or resale.

Solid Waste Management - includes a planned program for effectively controlling the generation, storage, collection, transportation, processing and reuse, conversion or disposal of solid wastes in a safe, sanitary, aesthetically acceptable, environmentally sound and economic manner. It includes all administrative, financial, environmental, legal and planning functions as well as the operational aspects of solid waste handling, disposal and resource recovery systems necessary to achieve established objectives.

Special Wastes - tires and rubber products, construction and demolitions wastes, hazardous wastes (Group 1), hospital wastes, pathological wastes (infectious wastes), dead animals, litter, automobiles (obsolete and abandoned), waste oils, street sweepings, sewage sludges and screenings.

Street Collection - includes combustible yard waste from residential dwellings placed at the curb for special collection with, or separate from, regular municipal waste collection.

Street Sweepings - include materials picked up by manual or mechanical sweeping of alleys, streets, and sidewalks; litter from public litter receptacles; and materials removed from catch basins.

Tire and Rubber Products - include damaged or worn-out tires from cars, trucks, tractors, airplanes, etc., and other items made of rubber.

Transfer/Processing Station or Stations - include those facilities utilized to receive solid wastes; temporarily store, separate, convert, or otherwise process the materials in the solid wastes; or to transfer the solid wastes directly from smaller to larger vehicles for transport to their final place of disposition.

Waste Oils - include crankcase oils drained from motor vehicles and other lubricating oils.

Vector - includes any insect or other arthropod, rodent, or other animal capable of transmitting the causative agents of human disease, or of disrupting the normal enjoyment of life by adversely affecting the public health and wellbeing.

Yard Wastes - include combustibles: Grass, yard trimmings and wood.
Noncombustibles: Dirt and rock.

Appendix

B

Demographic Data For Waste Generation And Collection Areas

Tables B-1, B-2 and B-3 presented here summarize statistical data relating to both waste generation areas and collection areas. The waste generation area is the basic division unit for area used within Sacramento County for solid waste planning. Collection areas are made up of a group of waste generation areas.

See Chapter Four for additional details concerning demographic data.

TABLE B-1
WASTE GENERATION AREA STATISTICS

Waste Generation Areas	Census Tract Numbers Included	Area in Acres
1	25% 70.02, 80% 71	26,779
2	72.01, 72.02, 72.03	12,100
3	74.01	5,356
4	81.02, 81.03, 81.04	3,867
5	81.01, 81.08	5,157
6	82.02, 82.03, 82.04, 82.05	6,744
7	82.01, 84	3,967
8	83, 85	14,878
9	80.01, 80.02	6,546
10	79	1,587
11	81.05, 81.06, 81.07	2,975
12	76, 77, 78	4,562
13	74.05, 75	5,356
14	74.02, 74.03, 74.04	1,984
15	73	2,579
16	64, 65, 67, 72.04	6,348
17	75% 70.02, 20% 71, 70.01	11,108
18	62.02, 55.02, 63, 66	1,785
19	68, 69	2,579
20	56.01, 61, 62.01	1,984
21	59.01, 59.02, 60	2,380
22	57.01, 58.01, 58.02	2,777
23	57.02, 65% 54	1,587
24	10% 54, 54.01, 56.02	1,984
25	4, 5, 6, 7, 10, 11, 14, 53	2,777
26	8, 9, 12, 13, 19, 20, 21	1,587
27	1, 2, 3, 25% 54	1,389
28	15, 16, 17	1,388
29	40% 51, 52	4,959
30	91	3,967
31	89.01	2,975
32	89.02, 98% 90*	6,149
33	88	5,356
34	80% 86, 87	92,041
35	60% 51, 2% 90, 92, 35% 93.01	28,168
36	29, 30, 31.01, 31.02, 35% 44.01	2,182
37	18, 27, 28, 37	992
38	22, 23, 24, 25, 26	2,579
39	33, 35.01, 35.02, 36, 39	1,984
40	65% 44.01, 44.02, 5% 45, 90% 46.01, 46.02	1,389
41	32.01, 32.02, 10% 46.01, 45% 48	1,388
42	75% 45, 47, 55% 48, 50%, 49, 50	2,976
43	38, 41, 10% 45	2,182
44	34, 40	5,753
45	42, 43	2,579
46	10% 45, 50% 49, 10% 96	6,349
47	65% 93.01, 93.02, 80% 95*, 90% 96	108,307
48	20% 86, 98% 94*	122,192
49	2% 94*, 20% 95*	6,744
50	65% 97	28,961
51	15% 97, 98	46,020
TOTAL		630,302

*special division

TABLE B-2
Collection Service Areas
by
Waste Generation Areas

Collection Service Areas	Waste Generation Areas Included
A	16, 17, 18, 19 26, 26, 27, 28, 29 36, 37, 38, 39 41 43, 44, 45, 46
B	1, 2, 3, 4, 5, 6 9, 10, 11, 12, 13, 14, 15 20, 21, 22, 23, 24 30, 31, 32, 33, 34, 35 40 42
C	7, 8
D	47, 48, 49
E	50
F	51

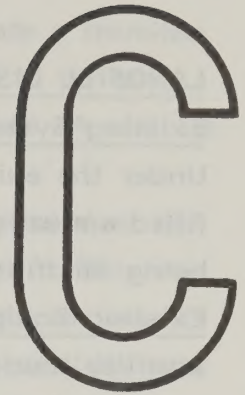
TABLE B-3

Population Forecasts by Collection Areas

Collection Area	1975	Growth Rate*	1980	Growth Rate*	1985	1990	Growth Rate*	2000
A	267,605	0.84%	279,150	1.03%	293,279	309,385	0.92%	339,173
B	381,439	2.01%	421,891	1.66%	457,874	497,546	1.30%	566,306
C	9,049	2.02%	10,000	1.09%	10,559	11,150	0.90%	12,200
D	21,815	2.11%	24,239	2.46%	27,614	31,459	1.44%	36,303
E	2,046	0.40%	2,087	0.30%	2,118	2,150	0.50%	2,260
F	2,072	0.40%	2,133	0.30%	2,145	2,178	0.50%	2,289
TOTAL	684,026	1.55%	739,480	1.45%	793,589	853,868	1.16%	958,531

*Growth Rates are annual rates for 10 year periods from Sacramento County Planning Department Data

Appendix



Landfill Disposal Cost Analysis

INTRODUCTION

This appendix contains an analysis of the landfill disposal cost for seven different levels of operation. They are:

1. Existing system with 1980 refuse tonnage at the County landfill using existing equipment;
2. Alternative 1A and 1B (1980 tons) at the County landfill;
3. Alternative 2A (1980 tons) at the County landfill;
4. Alternative 2B (1980 tons) at the County landfill;
5. Alternatives 1A and 1B (1980 tons) at the city landfill;
6. Alternatives 2A and 2B (1980 tons) at the city landfill; and
7. 15 and 25 tons/day landfills.

The following analysis evaluates the equipment and labor requirements of the various alternatives and subsequently subtracts the cost of unneeded equipment and labor from the known cost of the existing system. Transfer costs and any revenue that might be obtained from resource recovery are not part of this analysis.

LANDFILL DISPOSAL COST ANALYSIS FOR SACRAMENTO COUNTY LANDFILL

Existing System Costs

Under the existing system, 363,485 tons of municipal refuse are land-filled annually. None of this refuse is currently processed prior to being landfilled.

Existing Equipment At the County Landfill

1 utility truck, 2 water trucks, 1 grader, 1 F.W.D. Compactor, 1 pull scraper, 2 scrapers, 3 crawlers.

Existing County Landfill Budget (Fiscal Year 1975-76)

Salaries	\$264,438
Services and supplies	\$253,079
Depreciation	<u>\$ 86,120</u>
Total annual Expenditures	\$603,637

<u>Present Waste Handling Equipment</u>	<u>Annual Operating Hours</u>
Int. TD - 25 crawler	1,000 hrs/yr
Ac HD - 21 crawler	1,550 hrs/yr
Int. TD - 25 crawler	2,700 hrs/yr
F.W.D. 4-wheel compactor	<u>1,200 hrs/yr</u>
TOTAL	6,450 hrs/yr

From records of tons received in previous years, the estimated quantity to be disposed of at the County landfill during the fiscal year of 1975-76 is 363,485 tons. If this tonnage is projected to 1980 using a 2.01% growth rate, the County will dispose of 401,514 tons in 1980. Therefore, the cost of disposal at the County landfill under existing conditions for 1980 quantities is:

$$\frac{\$603,637}{401,514 \text{ tons}} = \$1.50/\text{ton}$$

DISPOSAL COST AT THE COUNTY LANDFILL UNDER ALTERNATIVE 1A AND 1B

Under Alternative 1A and 1B, approximately 75% of the municipal refuse in the County will be disposed of at the County landfill and the remaining 25% will be disposed at the city landfill. The only difference

between Alternative 1A and 1B is that 1B would incorporate a transfer station to serve the City of Sacramento. The annual tons to be land-filled would be the same at each landfill under Alternatives 1A and 1B.

Using 1980 projected waste quantities, the annual tons disposed at the County landfill would be 436,240 tons/yr or 1,195 tons/day. This is non-processed waste because Alternatives 1A and 1B do not include milling. The County landfill is presently handling 1,000 tons/day and it is estimated that it could handle 1,300 tons/day of unmilled refuse; therefore, the existing equipment is sufficient. Since existing equipment is sufficient, expenditures for the existing system can be applied to Alternative 1A and 1B.

Total expenditures = \$603,637

Total annual tons = 436,240 tons

Therefore, the disposal cost at the County landfill under Alternative 1A and 1B = $\frac{\$603,637}{436,240 \text{ tons}}$ = \$1.38/ton

DISPOSAL COST AT THE COUNTY LANDFILL UNDER ALTERNATIVE 2A

Under Alternative 2A it is assumed that most (75%) of the County's refuse is either directly hauled or transferred to the consolidated processing station, the remainder (25%) being directly hauled to the County landfill. The refuse delivered to consolidated processing is subject to materials recovery. The type and quantity of materials recovered is outlined in Appendix F. Under Alternative 2A there is no recovery of non-ferrous and glass materials by mechanical separation. 9.4% of the refuse, or 40,356 tons, will be recovered annually. The quantity of waste directly hauled to the County landfill (unmilled) is 150,829 tons/yr. The quantity of refuse transferred to the County landfill from consolidated processing (milled) is 217,239 tons/yr. The quantity of waste transferred to the city landfill (milled) is 171,727 tons/yr. The above quantities total 580,151 tons/yr.

This equals: 595 tons/day milled

413 tons/day unmilled

TOTAL = 1,008 tons/day

The quantity of waste disposed at the County landfill under Alternative 2A is 187 tons/day less than Alternatives 1A and 1B. Because the tonnage has been decreased and milled refuse is easier to spread and compact than unprocessed refuse, one less crawler will be required at the County landfill. It is assumed milled refuse does not require daily cover; thus, one less scraper will be needed. With less equipment there will be less labor requirements. Two equipment operators will be released. All savings are summarized in Table C-1. The total annual tons disposed at the landfill are 368,068 tons/yr. Therefore, the disposal cost at the County landfill equals

$$\frac{\$519,630/\text{yr}}{368,068 \text{ tons/yr}} = \$1.41/\text{ton}$$

DISPOSAL COST AT THE COUNTY LANDFILL UNDER ALTERNATIVE 2B

Under Alternative 2B it is assumed that the County landfill is closed to direct haul and all municipal refuse must be transferred or direct hauled to the consolidated processing facility for disposal. Processed waste will then be disposed at both the city and County landfill sites. The type and quantity of material recovered at consolidated processing is outlined in Appendix F. The annual tonnage entering the disposal system is reduced by 3.5% or 78,320 tons/yr. The quantity transferred to the County landfill from consolidated processing (milled) is 330,104 tons/yr. The remaining 171,727 tons of processed waste are disposed of at the city landfill. The total quantities for Alternatives 2B are 580,151 tons/yr. Studies available from the Madison, Wisconsin, milled refuse landfill operation indicate that landfill pushing equipment units can each handle 500 tons/day. Assuming seven hours operating time for an eight hour working day, each piece of equipment will push 71.43 tons of waste per hour. The annual equipment operating hours are

$$\frac{330,104 \text{ tons/yr}}{71.43 \text{ tons/hr}} = 4,621 \text{ hours.}$$

The equipment (crawler tractors or

TABLE C-1
DISPOSAL COST FOR ALTERNATIVE 2A

	NO. OF UNITS RELEASED	COST SAVINGS	EXISTING EXPENDITURES	NEW COST
EQUIPMENT	2	\$41,866	\$359,175	\$317,309
MANPOWER	2	\$42,141	\$219,950	\$177,809
MISCELLANEOUS	-	-	\$ 24,512	\$24,512
TOTAL	-	\$84,007	\$603,637	\$519,630

compactors) required is $\frac{4,621 \text{ hrs}}{2,548 \text{ hrs/unit}} = 1.81 \text{ units}$. A factor of

125% is used to allow for vehicle breakdown time. $(1.81 \text{ units}) (125\%) = 2.26 \text{ units}$.

Three compaction equipment units could handle the quantity of refuse to be landfilled under Alternative 2B. Since all the refuse landfilled under Alternative 2B is milled and since milled refuse does not require daily cover, two less scrapers are required. All other existing equipment will be retained. All savings are summarized in Table C-2. The total annual tons disposed at the landfill are 330,104 tons/yr. Therefore, the disposal cost at the County landfill equals

$$\frac{\$516,335/\text{yr}}{330,104 \text{ tons/yr}} = \$1.57/\text{ton}$$

LANDFILL DISPOSAL COST ANALYSIS FOR SACRAMENTO CITY LANDFILL

Existing System Costs

Under the existing system, 228,990 tons of unprocessed municipal refuse are disposed at the city landfill annually. The city costs are reported to be \$1.20 per ton for disposal. Lacking more specific information about the disposal costs, it will be assumed that their existing budget is $(228,990 \text{ tons/yr}) (1.20/\text{ton}) = \$274,788/\text{yr}$.

The following is a list of equipment currently operating at the city landfill:

1 grader, 2 compactors, 2 crawlers, 1 scraper, 1 water truck.

DISPOSAL COSTS AT THE CITY LANDFILL UNDER ALTERNATIVES 1A AND 1B

Under Alternatives 1A and 1B the tonnage of waste disposed at the city landfill will remain relatively unchanged until 1982 from present levels. Therefore, no change in disposal costs should result until 1982.

DISPOSAL COSTS AT CITY LANDFILL UNDER ALTERNATIVES 2A AND 2B

Under Alternatives 2A and 2B, 171,727 tons of milled refuse will be disposed at the city landfill. There will be a cost savings to the city

TABLE C-2
DISPOSAL COST FOR ALTERNATIVE 2B

	NO. OF UNITS RELEASED	COST SAVINGS	EXISTING EXPENDITURES	NEW COST
EQUIPMENT	3	\$45,161	\$359,175	\$314,014
MANPOWER	2	\$42,141	\$219,950	\$177,809
MISCELLANEOUS	-	-	\$ 24,512	\$ 24,512
TOTAL	-	\$87,302	\$603,637	\$516,335

due to reduced tonnages requiring landfill and economic benefits of land-filling milled refuse. Studies available from the Madison, Wisconsin, milled refuse landfill operation indicate that landfill pushing equipment units can each handle 500 tons/day of milled refuse. Therefore, for seven hours operating time for an eight hour working day each piece of equipment will handle 71.43 tons of waste per hour. The required annual equipment operating hours are $\frac{171,727 \text{ tons/yr}}{71.43 \text{ tons/hr}} = 2,404 \text{ hours}$.

The equipment (crawler tractors or compactors) required is

$$\frac{2,404}{1,820 \text{ hrs/unit}} = 1.32 \text{ units. A factor of 125\% is used to allow for}$$

vehicle breakdown time so $(1.32 \text{ units}) (125\%) = 1.65 \text{ units}$; two units will be needed. Thus, one compactor and one crawler will be sufficient to handle the assumed quantity of refuse. A scraper will also be retained to provide once a week cover of the milled refuse. Daily cover would no longer be required. The release of a compactor and a crawler along with the decreased use of the scraper will result in manpower saving. One equipment operator can be released. The saving from both equipment and labor are summarized in Table C-3. Based on this analysis, cost to landfill 171,727 tons of milled refuse would then be \$182,363/yr. This results in:

$$\frac{\$182,363/\text{yr}}{171,727 \text{ tons/yr}} = \$1.06/\text{ton.}$$

TABLE C-3

DISPOSAL COSTS FOR ALTERNATIVES 2A & 2B

	NO. OF UNITS RELEASED	ANNUAL COST SAVINGS
EQUIPMENT	2	\$ 71,625
MANPOWER	1	\$ 20,800
TOTAL	-	\$92,425
EXISTING BUDGET		\$274,788
NEW BUDGET		\$182,363

SMALL LANDFILL COSTS

The cost of operating small landfills is important when alternatives of disposal are being considered for small communities. Communities such as Folsom, Galt and Isleton might consider the possibility of owning and operating their own landfill. The cost of owning and operating a 15 ton per day landfill (see Table C-4) comes to

$$\frac{\$58,640/\text{yr}}{(15)(365) \text{ tons/yr}} = \$10.71/\text{ton}.$$

The cost of owning and operating a 25 ton per day landfill (see Table C-5) comes to

$$\frac{\$70,421/\text{yr}}{(25)(365) \text{ tons/yr}} = \$7.72/\text{ton}.$$

Since each of these communities generates less than ten tons per day, each would experience operating expenses of well over ten dollars per ton. The derivation of costs of owning and operating two different size landfills (15 and 25 ton per day) is outlined in the preceeding section. These costs are summarized in Tables 4 and 5.

Derivation of Costs for a 15 Tons Per Day Landfill

The required area is determined as follows:

1. $\frac{(15 \text{ Tons/day})(2,000 \text{ lb/ton})}{900 \text{ lb/cy}} = 33.3 \text{ cy/day or } 233/3 \text{ cy/wk}$
+ 25% cover requirements = 291.7 cy/wk
2. Depth of 5 feet
3. Life of 20 years
 $(291.7 \text{ cy/wk}) \times 1040 \text{ wks/yr} = 303,368 \text{ cy/yr}$
Area Required = $\frac{303,368 \text{ cy}}{(5/3) \text{ yds}} = 182,021 \text{ sq yd} = 1,638,187 \text{ sq ft}$
= 37.6, rounded to 38 acres

TABLE C-4

COST ESTIMATE FOR A 15 TONS
PER DAY DISPOSAL SITE

	Capital Cost	Annual Cost
1A. Land Acquisition		
38 acres @ \$1,000/acre	\$ 38,000	
1B. Amortization		
(20 yrs. @ 8%)		\$ 3,870
2A. Improvement Cost	\$ 8,000	
2B. Improvement Amortization		
(10 yrs. @ 8%)		\$ 1,192
3A. Equipment Cost	\$ 72,000	
3B. Equipment Amortization		
(8 yrs. @ 8%)		\$ 12,529
3C. Equipment Operation & Maintenance		\$ 8,400
4. Personnel (salaries and administration)		\$ 25,000
SUBTOTAL	\$118,000	\$ 50,991
5. Contingencies (15%)		\$ 7,649
TOTAL		\$ 58,640

TABLE C-5

COST ESTIMATE FOR A 25 TONS
PER DAY DISPOSAL SITE

	Capital Cost	Annual Cost
1A. Land Acquisition		
63 acres @ \$1,000/acre	\$ 63,000	
1B. Amortization		
(20 yrs. @ 8%)		\$ 6,417
2A. Improvement Cost	\$ 10,000	
2B. Improvement Amortization		
(10 yrs. @ 8%)		\$ 1,490
3A. Equipment Cost	\$ 72,000	
3B. Equipment Amortization		
(8 yrs. @ 8%)		\$ 12,529
3C. Equipment Operation and Maintenance		\$ 13,800
4. Personnel (salaries and administration)		\$ 27,000
	\$145,000	\$ 61,236
5. Contingencies (15%)		\$ 9,185
TOTAL		\$ 70,421

BASIS OF FIGURES

Equipment: 1-D5 Dozer	\$50,000
1-18' Trailer (shelter for personnel)	5,000
1-Pull scraper	12,000
1-Water Truck	<u>5,000</u>
	\$72,000

Operation & Maintenance:

D5 (1500 hrs @ \$5.00/hr)	\$ 7,500
Water truck O & M per yr	400
Pull scraper O & M per yr	<u>500</u>
	\$ 8,400

Personnel: Salaries & Benefits

1 person @ \$20,000 per yr	\$20,000
Administration	<u>5,000</u>
	\$25,000

Improvement cost	\$ 8,000
Access roads, utilities, fencing, etc.	

Derivation of Costs for a 25 Tons Per Day Landfill

The required area is: $\frac{(25\text{TPD}) (2,000 \text{ lb/ton})}{900 \text{ lb/cy}} = 55.6 \text{ cy/day}$

or 388.9 cy/wk, + 25% cover reg. = 486 cy/wk

Depth of 5 feet

Life of 20 years

$(485.1 \text{ cy/wk}) (1040 \text{ wks/yr}) = 505,544 \text{ cy/yr}$

$\frac{505,544 \text{ cy}}{(5/3) \text{ yds}} = 303,326 \text{ sq yd} = 62.7, \text{ rounded to } 63 \text{ acres}$

BASIS OF FIGURES

Equipment: 1-D5 Dozer	\$50,000
1-18' Trailer (shelter for personnel)	5,000
1-Pull scraper	12,000
1-Water truck	<u>5,000</u>
	\$72,000

Operations & Maintenance:

D5 (2500 hrs per yr @ \$5.00/yr)	\$12,500
Water truck O & M per yr	500
Pull scraper O & M per yr	<u>800</u>
	\$13,800

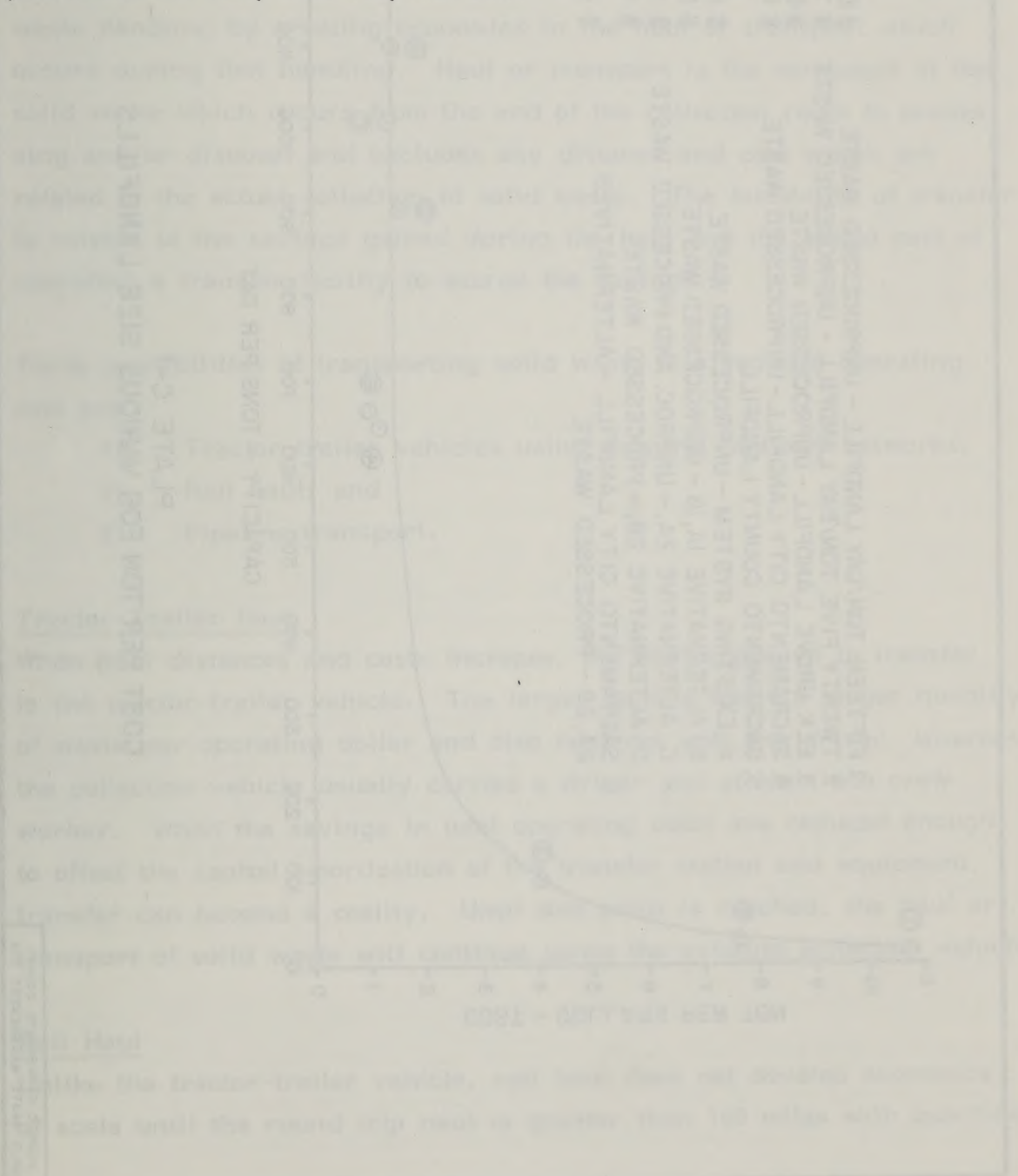
Personnel: Salaries & Benefits

1 person @ \$20,000/yr	\$20,000
Administration	<u>7,000</u>
	\$27,000

Improvement cost	\$10,000
Access roads, utilities, fencing, etc.	

Summary of Landfill Costs

All landfill costs have been used to develop a graphic plot of cost versus daily operating capacity. The data is shown in Plate C-1. The best fit line extended through the data points can be used to estimate the per ton cost of any size disposal site.



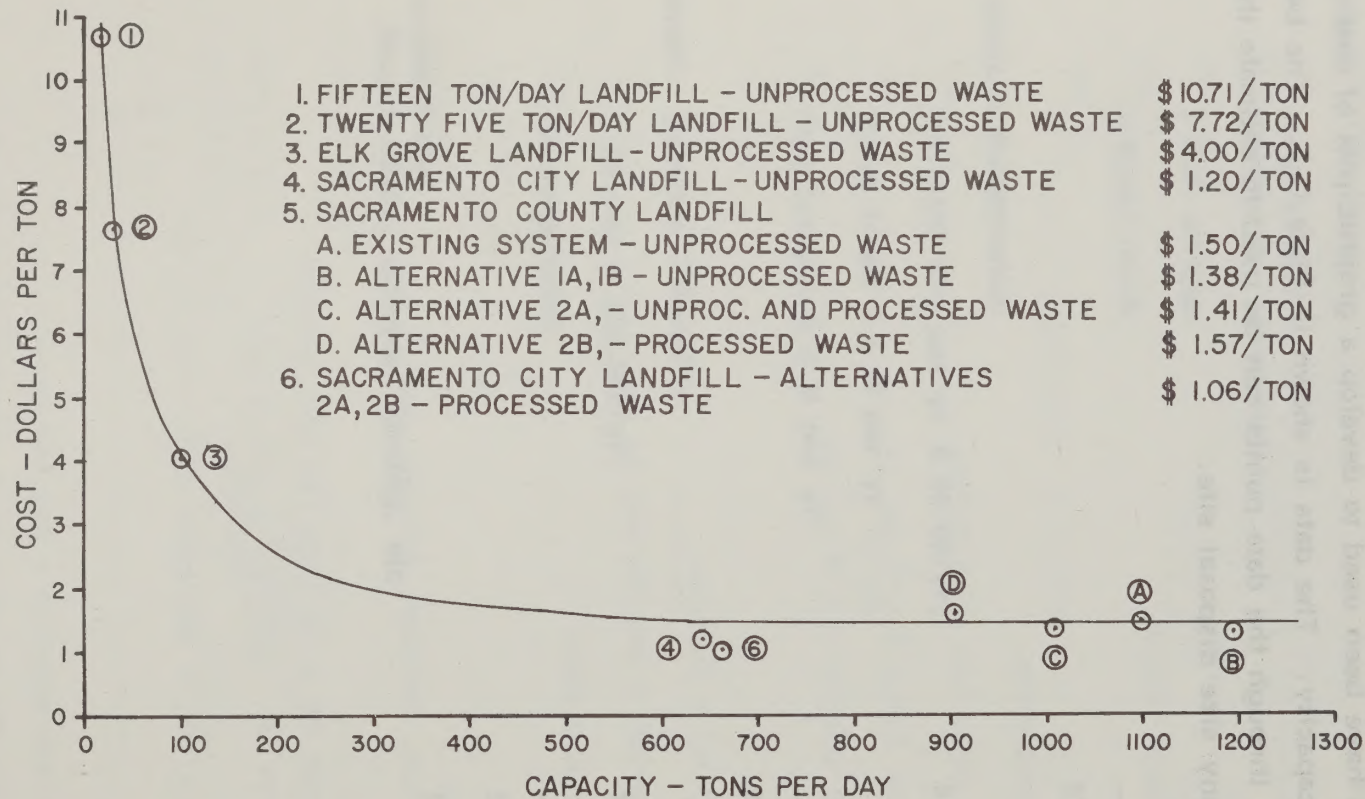


PLATE C-1
 COST PER TON FOR VARIOUS SIZE LANDFILLS

addresses County-operated transfer stations even though the Countywide system includes a privately operated (SAWDCO) transfer station in the downtown area of the City of Sacramento.

TRANSPORT AND TRANSFER

The main function of a transfer operation is to reduce the cost of solid waste handling by creating economies in the haul or transport which occurs during that handling. Haul or transport is the movement of the solid waste which occurs from the end of the collection route to processing and/or disposal and excludes any distance and cost which are related to the actual collection of solid waste. The feasibility of transfer is related to the savings gained during the haul and the added cost of operating a transfer facility to accrue the savings.

Three possibilities of transporting solid waste at a reduced operating cost are:

- 1) Tractor-trailer vehicles using existing highway networks;
- 2) Rail haul; and
- 3) Pipeline transport.

Tractor-Trailer Haul

When haul distances and costs increase, the first approach to transfer is the tractor-trailer vehicle. The larger vehicle hauls a larger quantity of waste per operating dollar and also requires only one driver, whereas the collection vehicle usually carries a driver and at least one crew worker. When the savings in total operating costs are reduced enough to offset the capital amortization of the transfer station and equipment, transfer can become a reality. Until that point is reached, the haul or transport of solid waste will continue using the existing collection vehicles.

Rail Haul

Unlike the tractor-trailer vehicle, rail haul does not develop economics of scale until the round trip haul is greater than 100 miles with quantities

of at least 1000 tons per day. Because of this fact, rail haul is usually not a consideration for transfer on the local level and only becomes important when dealing in the regional transfer of solid waste.

Pipeline Transport

Pipeline transport of solids, including solid waste, is being subjected to a significant amount of laboratory research, but at this time no viable transport alternatives have presented themselves. The pipeline transport may, in the future, offer many advantages in the areas of both collection and transport of liquid and solid wastes. A pipeline system would be characterized by a high capital cost and a relatively low operating cost. Lacking any real data, it would be difficult to project costs related to a system of this type.

FACILITY LOCATIONS

The proposed Countywide transfer station system is composed of five transfer stations and one processing facility (not including SAWDCO). The locations of four of these facilities have been identified in previous studies. The two which require more definition as to location are the Northeast Transfer Station and the Consolidated Processing Facility.

Northeast Transfer Station

This transfer station will serve the northeast sector of the County, the City of Folsom, and the Roseville area if that area chooses to participate in regional waste management. For the purpose of this analysis, the site was tentatively located at the centroid of waste generation area number five (see Plate D-1).

Consolidated Processing Facility

This facility requires a location in close proximity to (1) the center of waste generation (near Fulton Avenue and Arden Way) within the County, and (2) markets for both recovered materials and energy recovered in the future. Therefore, this analysis assumes that the Consolidated

Processing Facility will be located within a three mile radius of Fulton Avenue and Arden Way.

The locations of the two facilities described above are set for purposes of analysis; thus, future site specific studies will be required.

DESCRIPTION OF TRANSFER ANALYSIS

The need for a transfer station is determined by several factors: 1) the service it provides to the public in terms of convenience; 2) the economic benefit gained by waste haulers, both public and private, through reduced haul costs and increased productivity; and/or 3) the need to channel maximum amounts of waste into a resource recovery system for processing. The higher charge at a transfer station militates against its use. Thus, there must be substantial user cost benefits to guarantee that the system will be self-sustaining. These factors were considered in the analysis to route public-delivered waste, commercial waste, and residential waste.

Public Delivered Waste

Inconvenience or time involved in the haul is a major concern to the public. Disposal fees, haul distances and haul time were used as factors to determine routing. Through the application of these factors, it was determined that a public user must be 5.6 miles closer to a transfer station than to the County disposal site before he will economically benefit from using the transfer station. The analysis is described in detail on page D-10.

Commercial Wastes

It is assumed that the private commercial collectors will use the dumping location which maximizes their profits. The absence of a complete description of private collection routes requires the assumption that commercial loads are generated at the centroid of each waste generation area. The commercial waste analysis is presented in detail beginning on page D-12.

From the data developed in the inventory phase of the plan and the assumptions stated above, it was determined that the use of a transfer station by a commercial collector must reduce the collection route haul time by approximately 40%. This would provide 40% more time for route collection which in turn would economically justify use of the transfer station.

Residential Wastes

It is assumed that the productivity of each residential route is not affected by the use of a transfer station over a landfill. It is further assumed that the decision to use a transfer station or disposal site rests on haul cost savings accrued by using the closest transfer station. Obviously, the fact that the residential hauler makes only one to two trips to disposal per day would preclude substantial time savings accruing from the use of transfer station, and thus, the efficiency of the residential route would be much less affected than that of the commercial hauler. It was determined that a transfer station must be at least 14.2 miles closer than a disposal site before it can be used with economic benefit by collection vehicles of 20 to 25 cubic yard capacity.

DESCRIPTION OF TRANSFER ANALYSIS WITH RESOURCE RECOVERY

When a major resource recovery system is incorporated in the solid waste system, the first priority is to route collected waste into the recovery process. The second priority is the economics of the disposal facilities. Waste may be diverted to processing by either closing the landfill sites to all but processed waste or by equalizing the fees so that cost is the same at the landfill sites as at the transfer stations. Both of these solutions shift waste away from the landfill sites.

TRANSFER STATION AND DISPOSAL SITE CONFIGURATION

The transfer station disposal site alternative configurations include 5 transfer stations, 1 processing facility and 2 landfill sites (see Plate D-2). These facilities are presented in three alternative configurations which

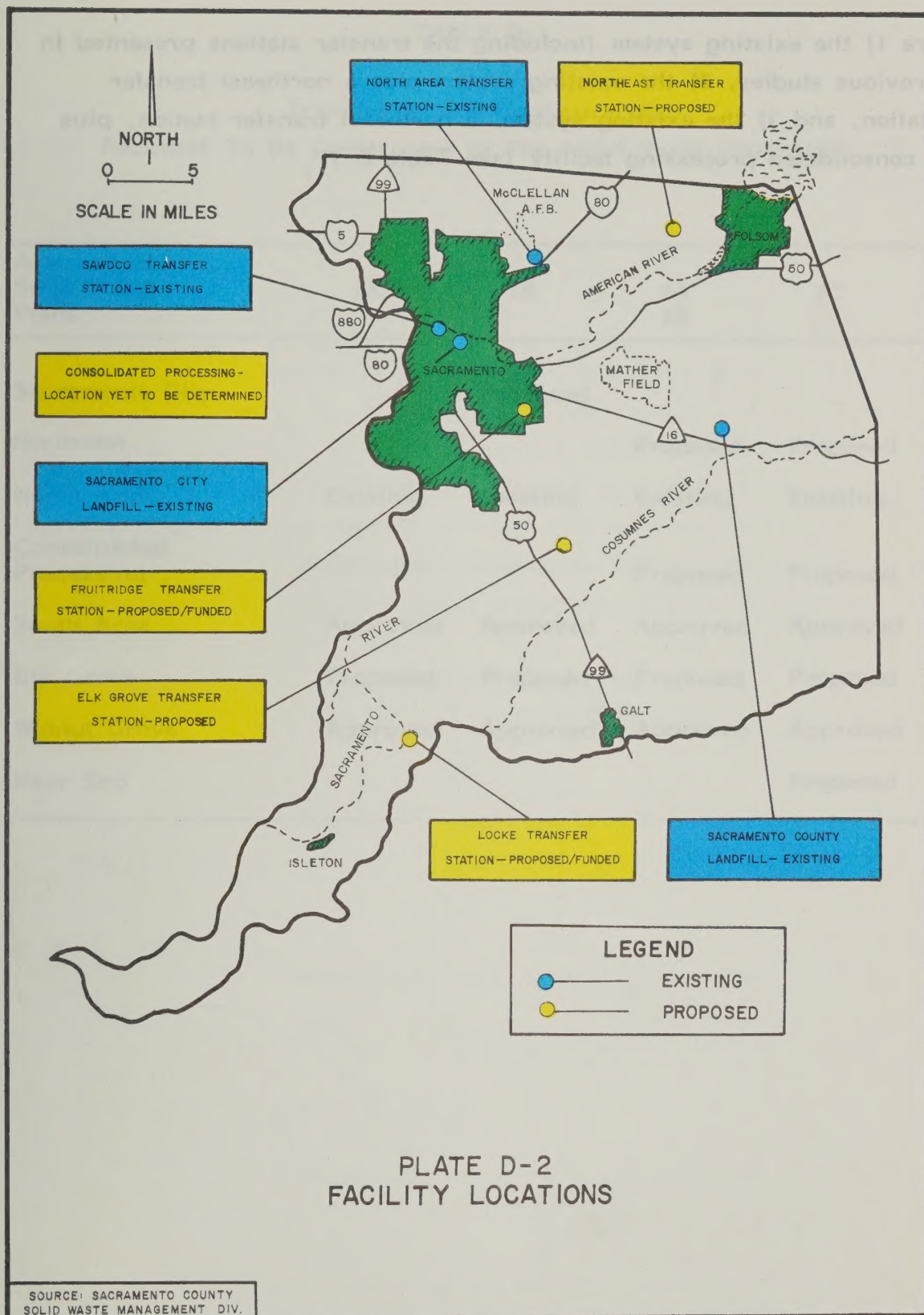


PLATE D-2
FACILITY LOCATIONS

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

are 1) the existing system (including the transfer stations presented in previous studies, 2) the existing system plus a northeast transfer station, and 3) the existing system, a northeast transfer station, plus a consolidated processing facility (see Table D-1).



TABLE D-1

-Transfer Station Configurations-
Facilities To Be Constructed In The Short Term (1976-1980)

Alternative Solid Waste Plans	1A	1B	2A 2B	2C
Sacramento City	Proposed			
Northeast			Proposed	Proposed
North Area	Existing	Existing	Existing	Existing
Consolidated Processing			Proposed	Proposed
South Area	Approved	Approved	Approved	Approved
Elk Grove	Proposed	Proposed	Proposed	Proposed
Walnut Grove	Approved	Approved	Approved	Approved
Rear End				Proposed

Public Haul Analysis

Analysis for use of transfer station vs County landfill for public delivered waste:

$$C = F + X \left[C_v + \frac{C_c}{V_e} \right] \quad \text{Eqn 1}$$

C = cost to transfer or disposal site (\$/ton)
(including wages)

F = fee at transfer or disposal site (\$)

X = one-way haul miles to transfer or disposal site (miles)

C_v = vehicle operating costs for private citizen (\$/mile)

C_c = value placed on citizens time (\$/hr)

V_e = velocity of vehicle during haul (miles/hr)

Transfer Station Usage Costs

$$C_t = F_t + X_t \left[C_v + \frac{C_c}{V_e} \right] \quad \text{Eqn 1a}$$

Disposal Site Usage Costs

$$C_d = F_d + X_d \left[C_v + \frac{C_c}{V_e} \right] \quad \text{Eqn 1b}$$

Set $C_t = C_d$ to find break even miles

$$F_t - F_d = \left[X_d - X_t \right] \left[C_v + \frac{C_c}{V_e} \right]$$

$$X_d - X_t = \frac{F_t - F_d}{C_v + \frac{C_c}{V_e}}$$

Assumed Values

$$F_t = \$2.00/\text{load}$$

$$F_d = \$1.00/\text{load}$$

$$C_v = \$0.10/\text{mile}$$

$$C_c = \$2.00/\text{hour}$$

$$V_e = 25 \text{ mph}$$

$$X_d - X_t = \frac{2.00 - 1.00}{0.10 + \frac{2.00}{25}}$$

$$X_d - X_t = 5.6 \text{ miles}$$

The miles to landfill site must be 5.6 miles or greater than the miles to the transfer station before the public will haul waste to the transfer station.

county landfill for

U

operating

Station

n of waste study and

5.2.5. Model for the study and

500 lbs/cu.yd.

$$67\% (500 \text{ lbs}) = 335.0$$

$$33\% (170 \text{ lbs}) = \underline{56.1}$$

$$391.1 \text{ lbs./cu. yd. average density}$$

$$\text{Commercial Waste} = 391.1 \text{ lbs./cu.yd. (Average)}$$

- 4) Average one-way haul mileage to disposal site from waste generation areas north of Calvin Road was determined by averaging mileages for each of the 46 areas. (Area 1-46) (Exclude areas 7, 8, and 34)

$$\text{Average one-way mileage} = 17.5 \text{ miles}$$

- 5) Tonnage hauled by collection vehicle (commercial)

$$(\text{Volume}) (\text{Density}) = \text{Ton/Load}$$

$$\frac{(23 \text{ cu. yds.}) (391.1 \text{ lbs./cu. yd.})}{2,000 \text{ lbs./ton}} = 4.50 \text{ tons/load}$$

$$\text{Tonnage/truck load} = 4.50 \text{ tons}$$

- 6) Average loads per day made by each truck

$$\frac{953 \text{ tons/day}}{4.50 \text{ tons/load}} = 211.78 \text{ loads/day}$$

$$\frac{211.78 \text{ loads/day}}{57 \text{ trucks}} = 3.72 \text{ loads/truck/day}$$

57 trucks

$$\text{Average loads/day} = 3.72 \text{ loads/day/truck}$$

- 7) Average daily haul mileage

$$= (2 \text{ way}) (17.5 \text{ miles (one way)}) (3.72 \text{ loads/truck/day})$$

$$= 130.20 \text{ miles (Daily haul)}$$

$$\text{Haul miles/day/truck} = 130.20 \text{ miles}$$

- 8) Average haul time for 3.72 trips (loads)

$$\frac{130.20 \text{ miles}}{35 \text{ mph}} = 3.72 \text{ hours (haul time)}$$

$$\text{Average Haul time/day} = 3.72 \text{ hours}$$

- 9) Collection time/load (average)

$$8 \text{ hours/day} - 3.72 \text{ hours (haul)} = 4.28 \text{ hours (collection)}$$

$$\frac{4.28 \text{ hours/day}}{3.72 \text{ loads}} = 1.15 \text{ hours/load} \quad \begin{array}{l} \text{collection} \\ \text{time} \end{array}$$

$$\text{Collection time/load} = 1.15 \text{ hours/load}$$

Use of Transfer Station vs Disposal Site for disposal of commercial waste.

Net dollars in Revenue for commercial collectors.

$$\left[\begin{array}{c} \text{Net} \\ \$ \end{array} \right] = L(RV) - F(W)(L) - C \quad \text{Eqn 2}$$

$$C = C_w + 2XHL \quad \text{Eqn 3}$$

H = haul cost/mile (\$/mile)

L = number of loads

R = revenue rate for collection/cu. yd. (\$/cu. yd.)

V = volume of truck (or load if not full)

F = gate fee for dumping (\$)

W = net weight (for refuse only) (tons)

C = operating cost of vehicle and driver wages (\$/hr.)

X = one way distance from waste generation areas to dumping sight (miles)

C_w = drivers wages (\$/hr.)

Disposal Site Usage - Net Dollars in Revenue

$$\left[\begin{array}{c} \text{Net} \\ \$ \end{array} \right]_d = L_d (RV) - F_d(W) (L_d) - C_w - 2X_d H L_d \quad \text{Eqn 2a}$$

Transfer Station Usage - Net Dollars in Revenue

$$\left[\begin{array}{c} \text{Net} \\ \$ \end{array} \right]_t = L_t (RV) - F_t (W) (L_t) - C_w - 2X_t H L_t \quad \text{Eqn 2b}$$

Eqn 3b

To justify haul to transfer over disposal for reasons of economics

$$\left[\begin{array}{c} \text{Net} \\ \$ \end{array} \right]_t - \left[\begin{array}{c} \text{Net} \\ \$ \end{array} \right]_d \geq 0$$

Solve for the equal to condition to determine load to the transfer station per vehicle per day.

$$\begin{bmatrix} \text{Net} \\ \$ \end{bmatrix}_t = \begin{bmatrix} \text{Net} \\ \$ \end{bmatrix}_d$$

$$L_d RV - F_d WL_d - C_w - 2X_d HL_d = L_t WL_t - C_w - 2X_t HL_t$$

Assumed Values

R = \$3.00/cu. yd. (in packer vehicle; not in bin before loading)

V = 23 cu. yds.

F_d = \$1.50/ton

F_t = \$5.75/ton

H = \$0.15/mile

W = 4.50 tons

C_w = wage remain constant for both cases (cancels out in analysis)

$\begin{matrix} X_d \\ X_t \end{matrix} \left\{ \right.$ given values for each waste generation area

L_d = 3.72 loads/day/vehicle to disposal site

Solve equation above for L_t using values given

L_t = loads/day/vehicle to transfer station

$$L_t = \frac{231.57 - 1.12 X_d}{43.12 - 0.30 X_t}$$

Use given X_d and X_t values for each generation area to find L_t for each area.

Using the calculated L_t for each generation area, find the one way break-even miles for waste hauled from that waste generation area.

$$\left[\begin{array}{c} \text{Break} \\ \text{Even} \\ \text{Miles} \end{array} \right] = X_a - \frac{1}{2} \left[\frac{T - L_t T_c}{L_t} \right] V_e \quad \text{Eqn 4}$$

X_a = one-way mileage to disposal site (County-wide average)

T = hours/shift

T_c = hours - collection time/load

L_t = loads/day/vehicle to transfer station

V_e = truck velocity during haul

Assumed Values

X_a = 17.5 miles

T = 8 hours

T_c = 1.15 hours/load

L_t = varies for each waste generation area

V_e = 35 mph

Using given values, solve for the break-even miles for each waste generation area.

If -

$$X_t > X_d - \left[\begin{array}{c} \text{Break} \\ \text{even} \\ \text{miles} \end{array} \right]$$

Then waste will go to disposal site.

If -

$$X_t \leq X_d - \left[\begin{array}{c} \text{Break} \\ \text{even} \\ \text{miles} \end{array} \right]$$

Then waste will go to transfer station.

Data on one way break-even miles for all waste generation areas are presented in Table D-2. The values for L_t are calculated from

$$L_t = \frac{231.57 - 1.12X_d}{43.12 - 0.30X_t}$$

where L_t = loads/vehicle/day to the transfer station, X_d = one way haul miles from the waste generation area centroid to the disposal site and X_t = the one way haul miles from the waste generation area centroid to the transfer station.

The one way break-even miles or factor presented in Table D-2 are calculated from

$$\text{Factor} = X_a = \frac{1}{2} \left[\frac{T - L_t T_c}{L_t} \right] V_e \quad \text{Eqn 4}$$

or

$$\text{Factor} = 17.5 \text{ miles} = \frac{1}{2} \left[\frac{8\text{hrs} - L_t (1.15\text{hrs})}{L_t} \right] 35 \text{ mi/hr}$$

Each factor or one way break-even mileage is then compared with X_d and X_t to evaluate the feasibility of a commercial collector using the proposed transfer station.

For transfer to be feasible

$$X_d - \text{Factor} \geq X_t$$

TABLE D-2
CALCULATION OF BREAK EVEN DISTANCE

Waste Generation					
Area	X_d	Sta.	X_t	L_t	Factor
1	28.5	NA	11.5	5.03	9.79
2	24.4	NA	6.8	4.97	9.46
3	22.2	NA	5.3	4.98	9.51
4	19.6	NE	3.7	4.99	9.57
5	16.9	NE	0	4.93	9.23
6	18.9	NE	2.5	4.97	9.46
7	14.1	NE	5.5	(Folsom Service)	
8	14.2	NE	9.2	5.34	11.41*
9	14.8	NE	3.5	5.11	10.23
10	15.8	NE	5.3	5.15	10.44
11	17.9	NE	3.2	5.02	9.74
12	16.8	NA	5.8	5.14	10.39
13	19.0	NA	2.2	4.95	9.34
14	22.1	NA	2.3	4.87	8.88
15	22.0	NA	2.2	4.87	8.88
16	20.9	NA	4.2	4.98	9.51
17	24.4	C	7.0	4.98	9.51
18	18.8	NA	3.3	5.00	9.63
19	18.8	C	2.5	4.97	9.46
20	18.6	NA	4.1	5.03	9.79
21	18.3	NA	3.7	5.02	9.74
22	16.0	NA	6.5	5.19	10.65*
23	13.7	SA	4.3	5.17	10.55*
24	15.6	SA	6.0	5.18	10.69*
25	18.5	C	1.2	4.93	9.23
26	18.3	C	2.4	4.98	9.51
27	15.6	C	2.0	5.04	9.85
28	15.5	C	2.5	5.06	9.96
29	12.7	SA	1.3	5.09	10.12
30	11.5	SA	3.8	5.21	10.75*
31	14.0	NE	8.0	5.30	11.21*
32	11.9	NE	7.8	5.35	11.46*
33	9.8	SA	8.5	5.44	11.89*
34	4.3	CL	-	-	- *
35	9.7	SA	5.1	5.31	11.26*
36	15.1	SA	2.9	5.08	10.07
37	16.7	C	2.9	5.04	9.85
38	18.9	C	3.5	5.00	9.63
39	18.4	C	4.5	5.05	9.90
40	15.5	SA	3.7	5.10	10.17
41	14.6	SA	2.6	5.08	10.07
42	15.1	SA	4.6	5.14	10.39*
43	17.6	SA	6.4	5.14	10.39
44	20.1	SA	8.8	5.16	10.49
45	18.4	SA	8.0	5.18	10.60*
46	17.8	EG	7.5	5.18	10.60*
47	15.2	EG	3.9	> (Independent Disposal)	
48	16.9	EG	14.8		
49	22.4	EG	12.0		
50	32.2	WG	5.1	(Camarillo Sanitary)	
51	42.8	WG	9.7	(Delta Refuse)	

* Areas which will use County landfill rather than transfer. This means that $X_d - (\text{Factor}) < X_t$.

Residential Haul Analysis

Analysis for use of transfer stations vs County landfill for residential collection vehicles (Exclude City of Sacramento Collection)

$$C = F + 2XH$$

Eqn 5

C = collection and disposal costs (total) (\$/ton)

F = fee at transfer or disposal site (\$/ton)

X = one-way haul miles to transfer or disposal site (miles)

H = haul costs/ton mile (\$/ton mile)

Transfer Station Usage

$$C_t = F_t + 2X_t H$$

Disposal Site Usage

$$C_d = F_d + 2X_d H$$

Set $C_t = C_d$ to find break even miles

$$\begin{aligned} F_t - F_d &= 2H (X_d - X_t) \\ X_d - X_t &= \frac{F_t - F_d}{2H} \end{aligned}$$

Assumed Values

$F_t = \$5.75/\text{ton}$

$F_d = \$1.50/\text{ton}$

$H = \$0.15/\text{ton-mile}$ for 20 and 25 cu. yd. packer vehicles

$X_d =$ one-way haul miles

$X_t =$ one-way haul miles

$$X_d - X_t = \frac{5.75 - 1.50}{2(0.15)}$$

$$X_d - X_t = 14.2 \text{ miles}$$

The miles to the landfill site must be 14.2 miles or greater than the miles to the transfer station before residential waste collected in a packer type vehicle will be disposed of at the transfer station.

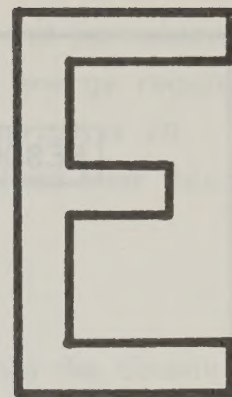
Energy Analysis

This solid waste management plan for Sacramento County contains provisions which will affect the energy requirements of various solid waste management activities. In order to evaluate these provisions it is necessary that energy requirements can be compared with those which:

- a. exist
- b. require
- c. generate
- d. demand

Table F-1 shows the flow of materials from landfills, as is required. The energy requirements for the processes involved are listed and are compared by this analysis. Energy benefits associated with the manufacture of products from recycled materials will not be analyzed at this time.

Appendix

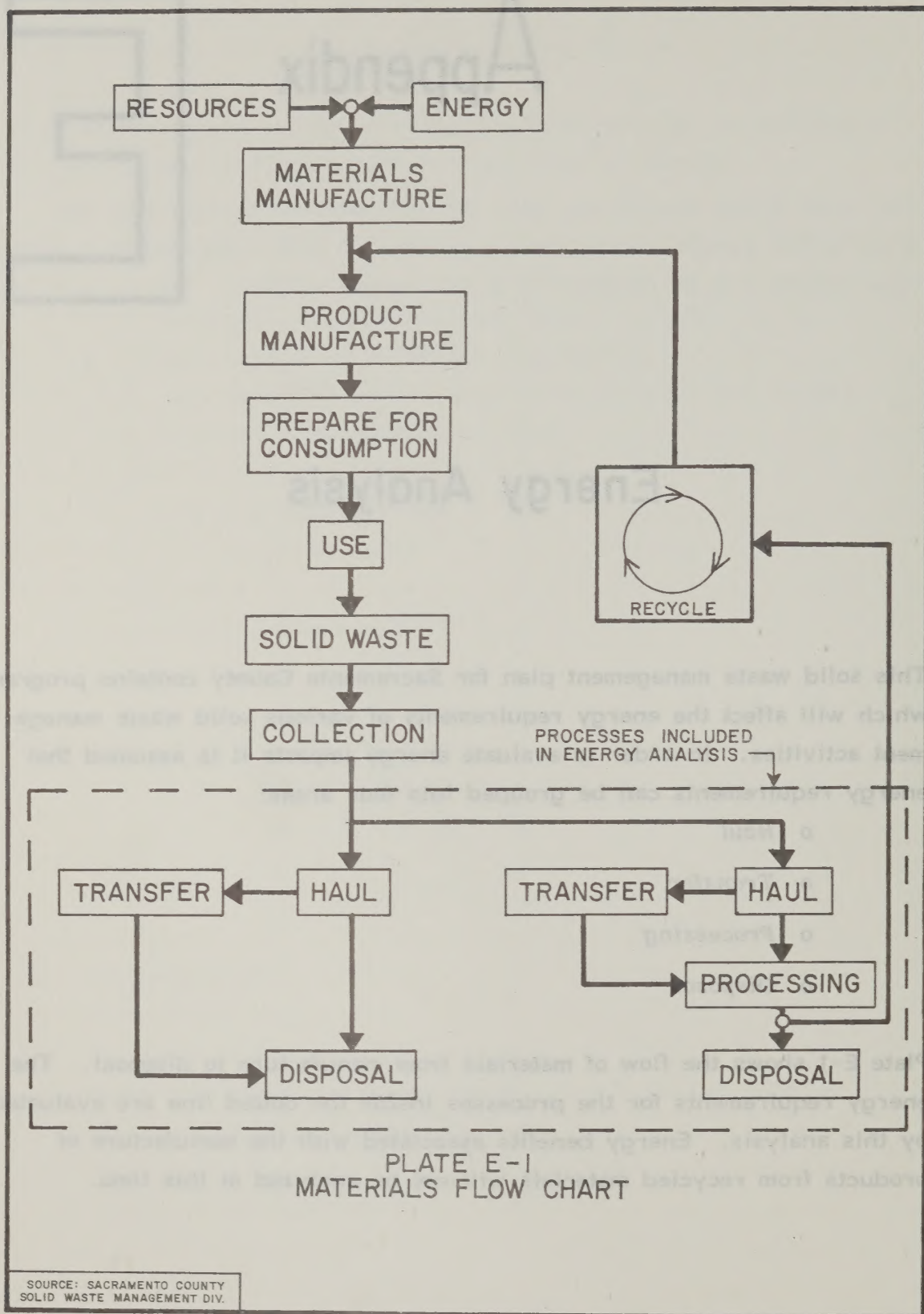


Energy Analysis

This solid waste management plan for Sacramento County contains programs which will affect the energy requirements of various solid waste management activities. In order to evaluate energy impacts it is assumed that energy requirements can be grouped into four areas:

- o Haul*
- o Transfer*
- o Processing*
- o Disposal*

Plate E-1 shows the flow of materials from manufacture to disposal. The energy requirements for the processes inside the dotted line are evaluated by this analysis. Energy benefits associated with the manufacture of products from recycled materials will not be analyzed at this time.



The following analysis discusses the various assumptions and parameters used in evaluating energy requirements. In all cases the energy requirements for plan Alternative 1A are contrasted with plan Alternative 2B (see Table E-1). A summary of energy requirements derived from this analysis is displayed in Table E-1.

ENERGY REQUIREMENTS FOR HAUL

It is assumed that the only entities which haul refuse within the County are as follows:

1. Private collectors which collect and haul commercial refuse in the area north of Calvine Road and residential, commercial, grass and leaves south of Calvine Road.
2. The City of Sacramento which collects and hauls residential grass and leaves within the city limits.
3. The County of Sacramento which collects and hauls residential grass and leaves in the area of the County north of Calvine Road excluding the City of Sacramento.
4. Citizens who haul private waste throughout the County.

In order to evaluate the energy used by these groups during haul, the following assumptions and conclusions were made:

Commercial Haul (Areas 1-46)

Assumptions

1. The County has been divided into 51 Waste Generation Areas as described in Chapter 4. Each Waste Generation Area has a discrete population with all waste assumed to be generated at its centroid. See Plate E-2.
2. Population data for the year 1980 were used along with the waste generation factors presented in Chapter 4 to determine refuse quantities.
3. Commercial vehicles are assumed to haul 4.5 tons per load except in Waste Generation Areas 7 and 8. A value of 3.5 tons per mile will be used in Waste Generation Areas 7 and 8. The value of

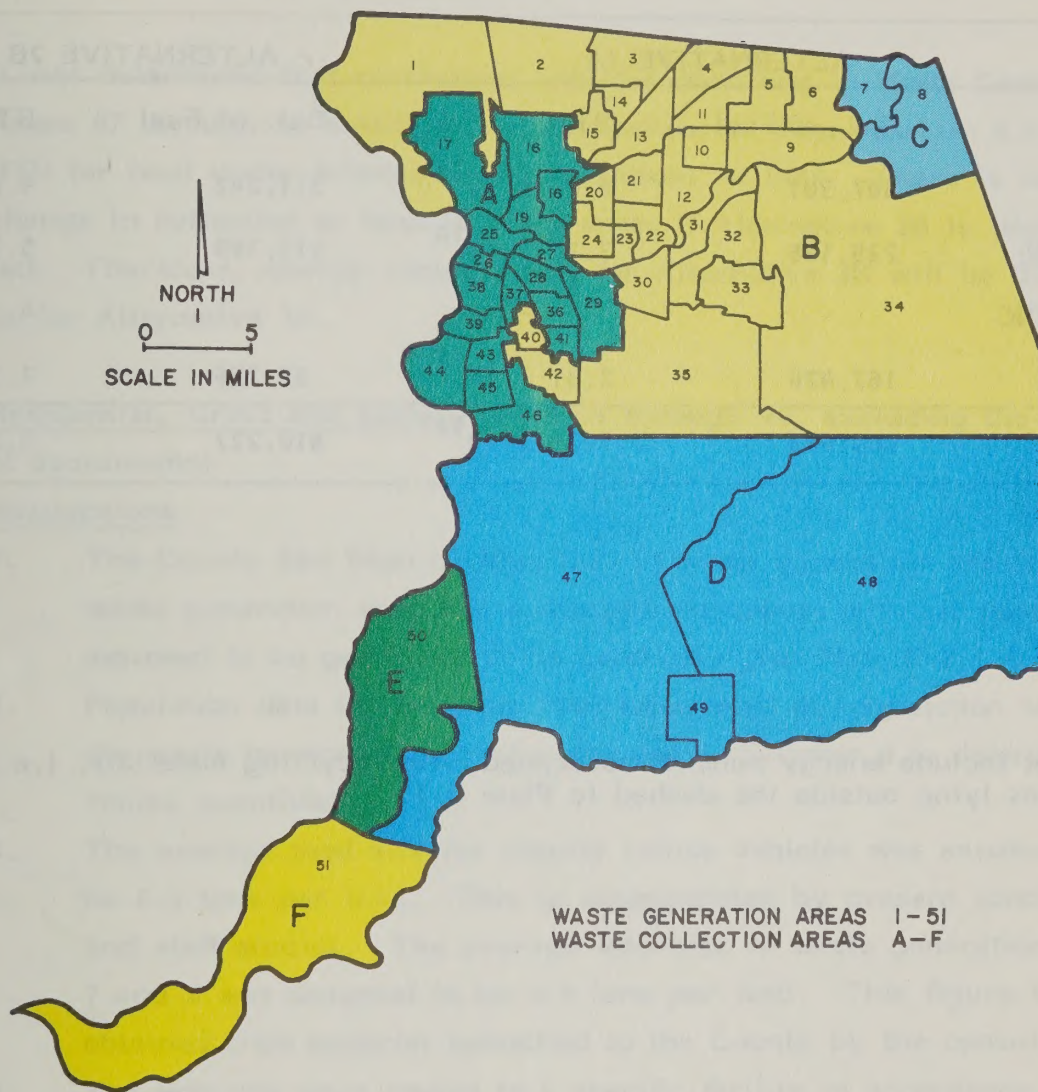
4.5 tons per load is based on analysis presented in Appendix D. The value of 3.5 tons per load for Waste Generation Areas 7 and 8 was provided by the consultant.

4. The vehicles were routed to the facility determined by the Commercial Haul Analysis in Appendix D. See Table D-2.
5. The vehicles are assumed to average 8.9 mpg during haul. This is the value used for Sacramento County's collection vehicles and is based on staff studies.
6. All vehicles were assumed to use diesel fuel with an energy value of 138,000 BTU per gallon.

It was found under Alternative 1A, that 67,581 gallons of diesel fuel or 9.3×10^9 BTU of energy would be required annually for haul by commercial vehicles in Waste Generation Areas 1 through 46. The annual energy requirement for Alternative 2B was found to be 30,425 gallons of diesel or 4.2×10^9 BTU. This reduction is due to decreased haul distances under Alternative 2B.

Commercial (Grass, leaves and residential areas 47, 48, 49, 50, 51) Assumptions

1. The County has been divided into 51 Waste Generation Areas. Each Waste Generation Area has a discrete population with all waste assumed to be generated at its centroid (see Plate E-1).
2. Population data for the year 1980 was used in conjunction with the waste generation factors presented in Table 4-5 to determine refuse quantities.
3. The average load size for vehicles operating in Waste Generation Areas 47, 48 and 49 were assumed to be 5 tons per load. The load size for Area 50 was assumed to be 4 tons per load and the load size for Area 51 was assumed to be 3.5 tons per load. These values were obtained from information provided by the consultant.
4. Commercial refuse will be hauled to the transfer stations determined to be the most economical (see Commercial Haul Analysis in Appendix D).



WASTE GENERATION AREAS 1-51
WASTE COLLECTION AREAS A-F

PLATE E-2
WASTE GENERATION AND COLLECTION AREAS

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

TABLE E-1
SUMMARY OF ENERGY REQUIREMENTS FOR
ALTERNATIVES 1A AND 2B

	ALTERNATIVE 1A		ALTERNATIVE 2B	
	Gal. of Fuel	BTU	Gal. of Fuel	BTU
HAUL	507,301	6.63×10^{10}	311,242	4.04×10^{10}
TRANSFER	229,188	3.16×10^{10}	413,199	5.70×10^{10}
PROCESSING	-	-	-	4.18×10^{11}
DISPOSAL	167,476	2.31×10^{10}	85,786	1.18×10^{10}
TOTAL	903,965	$1.21 \times 10^{11*}$	810,227	$5.27 \times 10^{11*}$

* Does not include energy benefits associated with recycling materials, i.e., those processes lying outside the dashed in Plate E-1.

5. The vehicles used for collection and haul were assumed to average 8.9 mpg during haul.
6. All vehicles were assumed to use diesel fuel with an energy value of 138,000 BTU/gallon.

It was determined that commercial vehicles operating in Waste Generation Areas 47 through 51 would use 17,244 gallons of diesel fuel or 0.1×10^9 BTU for haul under Alternative 1A conditions in 1980. There is no change in collection or haul in these areas if Alternative 2B is implemented. Therefore, energy requirements for Alternative 2B will be the same as for Alternative 1A.

Residential, Grass and Leaves (Areas 1 through 46, excluding the City of Sacramento)

Assumptions

1. The County has been divided into 51 waste generation areas. Each waste generation area has a discrete population with all waste assumed to be generated at its centroid. See Plate E-2.
2. Population data for the year 1980 were used in conjunction with the waste generation factors presented in Chapter 4 to determine refuse quantities.
3. The average load size for County refuse vehicles was assumed to be 6.9 tons per load. This is substantiated by present conditions and staff studies. The average load size in waste generation areas 7 and 8 was assumed to be 3.5 tons per load. This figure was obtained from material submitted to the County by the consultant.
4. The vehicles were routed to a specific facility in accordance with the Residential Haul Analysis presented in Appendix D.
5. The vehicles were assumed to use diesel fuel with an energy value of 138,000 BTU per gallon.

It was found that the vehicles collecting residential waste, grass and leaves in Waste Generation Areas 1 through 46, excluding the City of

Sacramento, would have an energy requirement for haul of 89,971 gallons of diesel fuel or 12×10^9 BTU for haul. The significant reduction in energy requirements is due to decreased haul distances under Alternative 2B.

Residential, Grass and Leaves (City of Sacramento)

Collection of grass and leaves in the City of Sacramento is a separate operation from residential collection. Therefore, the energy requirements for each type of refuse will be evaluated independently. Many of the assumptions apply to both analyses so they will be listed together. The assumptions are as follows:

Assumptions

1. The County has been divided into 51 Waste Generation Areas. Each Waste Generation Area has a discrete population with all waste assumed to be generated at its centroid (see Plate E-1).
2. Population data for the year 1980 were used in conjunction with the waste generation factors presented in Chapter 4 to determine refuse quantities.
3. The average load size assumed for grass and leaves collection was 2.1 tons per load. The value was determined by multiplying the average vehicle size (14 cubic yards) by the density of refuse (300 lb. per cubic yard).
4. The average load size assumed for vehicles hauling residential refuse was 3.4 tons per load. This is based on data gathered by the consultant for the City of Sacramento.
5. All refuse is assumed to be disposed at the city landfill under Alternative 1A. Under Alternative 2B, the City of Sacramento would haul refuse to a consolidated processing facility.
6. The vehicles were assumed to average 8.9 mpg during haul.
7. All vehicles were assumed to use diesel fuel with an energy value of 138,000 BTU per gallon.

The analysis of the City of Sacramento's energy requirements in 1980 for Alternative 1A concluded that 19,731 gallons of diesel fuel or 2.7×10^9 BTU would be required for haul of grass and leaves and 32,055 gallons or 4.4×10^9 BTU would be required to haul residential waste. Therefore, the City of Sacramento would have a total energy requirement of 7.1×10^9 BTU for haul in 1980. The introduction of a consolidated processing facility under Alternative 2B did not change the city's energy requirements.

Private Citizens (Areas 1-51)

Assumptions

1. The County is divided into 51 Waste Generation Areas. Each Waste Generation Area has a discrete population with all waste assumed to be generated at its centroid.
2. Population data for the year 1980 were used in conjunction with the waste generation factors presented in Chapter 4 to determine refuse quantities.
3. The average load size for private citizens was assumed to be 300 lb. per load. This figure was developed from staff studies.
4. Assignment of the citizens to a specific transfer station or other facility was the same as determined in the Public Haul Analysis in Appendix D.
5. The average mileage of private vehicles was assumed to be 16 mpg during haul.
6. All vehicles were assumed to use gasoline with an energy value of 125,000 BTU per gallon.

It was found under Alternative 1A that 290,719 gallons of gasoline or 36.3×10^9 BTU would be required for haul. Due to decreased haul distances under Alternative 2B, only 187,390 gallons of gasoline of 23×10^9 BTU would be required.

ENERGY REQUIREMENTS FOR TRANSFER

There are two distinct areas where energy is required for the basic transfer system. Energy is required for the internal operation of a transfer facility and also energy is needed to haul refuse to a disposal site or processing facility. Under Alternative 2B, transfer will also include the movement of processed waste from the consolidated processing facility to a disposal site.

Transfer Site Operations

North Area - The amount and cost of fuel used during 1975 at the North Area Transfer Station is known. Therefore, the fuel required per ton of refuse transferred can be calculated. To evaluate the amount of energy required for operation under Alternatives 1A and 2B, it is assumed that the amount of energy required is proportional to the waste inflow. All equipment at the site use diesel fuel which was assumed to have an energy value of 138,000 BTU per gallon. It was found that Alternative 1A would require 31,891 gallons of diesel or 4.4×10^9 BTU. Alternative 2B conditions at the North Area Transfer Station would require an energy expenditure of 32,760 gallons or 4.5×10^9 BTU.

Fruitridge - The exact amount of equipment stationed at the Fruitridge Transfer Station is not known as the station is not yet in operation. For purposes of analysis, it will be assumed that the energy requirement per ton of incoming refuse will be the same as that presently encountered at the North Area Transfer Station. It was found that 10,502 gallons of diesel or 1.4×10^9 BTU would be required under Alternative 2A. Increased waste due to the closure of the County landfill to direct haul would result in a large increase in energy usage. Alternative 2B would require 24,746 gallons of diesel fuel or 3.4×10^9 BTU of energy.

North East - Alternative 2B calls for the construction of the North East Transfer Station to serve residents in the area as the County landfill will be closed to direct haul. The energy required to operate the

facility was evaluated using the same assumption used for the North Area Transfer Station. It was found that 30,517 gallons of diesel fuel or 4.2×10^9 BTU of energy would be required.

Locke and Elk Grove - The Locke Transfer Station will not require any energy in its normal operation as no equipment will be stationed there for Alternatives 1A and 2B. The Elk Grove Transfer Station will have one loader at the site but its use will be limited. To evaluate the energy required to operate the loader, it was assumed that it would operate 2.5 hours per day, 260 days per year under Alternative 1A. It was also assumed that it would consume five gallons per hour. The energy requirements for Alternative 1A was calculated to be 3,250 gallons of diesel or 0.4×10^9 BTU. In order to evaluate the energy requirements for Alternative 2B, it was assumed that the increase in waste flow would cause a proportional increase in energy. The energy requirement for Alternative 2B was then found to be 3,430 gallons of diesel fuel or $.05 \times 10^9$ BTU.

Waste Movement

This section evaluates the energy requirements for waste movement between the transfer stations and the disposal and/or processing facilities. The evaluation of the energy requirements for Alternative 1A is based on three main assumptions. The first is that the transfer vehicles have a capacity of 17.5 tons. The second is that the transfer vehicles would take a predetermined route of known mileage to the disposal site and the third is that each would average 3.5 mpg. To determine the diesel requirement for transfer vehicles assigned to a specific station, the yearly tonnage was divided by 17.5 tons per load to determine the number of loads. The number of loads required in a year was multiplied by the round trip distance to the disposal site to determine the total miles in a year. The gallons of diesel required equals the total miles in a year divided by the miles per gallon of a transfer vehicle. It was found that 183,545 gallons of diesel fuel or 25.3×10^9 BTU of energy would be required.

The evaluation of the energy requirements for transfer under Alternative 2B used the same assumptions as under Alternative 1A. There was one modification and an addition to these assumptions. The routes of the transfer vehicles were modified such that they transfer waste first to the Consolidated Processing Facility (which for study purposes was located at the waste centroid for the County and then on to a landfill. An additional assumption was that only 70% of the transfer vehicles continue their route from the processing facility by transferring milled refuse to a landfill. The remaining 30% would return directly to their assigned transfer stations from the processing facility. The 30% reduction in haul trips to the landfill was due to decreased volumes through resource recovery and increased load efficiency due to shredded waste. It was calculated that 321,746 gallons of diesel fuel or 44.4×10^{10} BTU of energy would be required for transfer under Alternative 2B.

PROCESSING ENERGY REQUIREMENTS

The unknowns and complexities of studying the energy requirements of a consolidated processing facility for Sacramento County limited the staff in its analysis. Energy requirements for a 2000 TPD processing facility proposed by Garrett Research and Development Company was modified to estimate the requirement for Sacramento County's processing facility. The following information was obtained for a 2000 TPD plant operating 350 days per year and 24 hours per day.

The amount of waste entering the processing facility in 1980 will be 580,151 tons per year or 1,657 tons per day (350 days per year). Thus the above plant would only have to operate 19.9 hours per day to process the waste inflow. The kilowatt hours required per year can be found with the following calculations.

Consumed Power^{1,2}

A.	Feed Preparation and Magnetic Metals Recovery	2.50 kw/ton
B.	Glass Recovery	0.11 kw/ton
C.	Aluminum Recovery	0.30 kw/ton
D.	Off sites	<u>0.25 kw/ton</u>
	TOTAL	3.16 kw/ton

$$(3.15 \text{ kw/ton}) (1,657 \text{ tons/day}) (19.9 \text{ hr}) = \underline{104,196 \text{ kwh/day}} \text{ and}$$
$$(104,196 \text{ kwh/day}) (350 \text{ day/yr}) = \underline{3.6 \times 10^7 \text{ kwh/yr}}$$

In order to compare the energy requirements of the processing with the other components of the solid waste system, the following conversion of kilowatt hours to BTU was used.

1 kwh = 11,620 BTU @ 29.4 efficiency.

Therefore, $(3.6 \times 10^7 \text{ kwh/yr}) (11.620 \text{ BTU/kwh}) = \underline{4.2 \times 10^{11} \text{ BTU/yr}}$
will be required to run the processing facility.

ENERGY REQUIREMENTS FOR DISPOSAL

County Landfill

Alternative 1B fuel consumption at the County landfill during 1975 is known. The tonnage of waste disposed at the landfill during the same period is also known, so a fuel requirement per ton disposed was calculated.

This figure was assumed to remain constant for Alternative 1A so the 1980 tonnage was multiplied by the figure to yield the gallons of diesel and gasoline required to operate the facility. It was calculated that 2,736 gallons of gasoline and 123,198 gallons of diesel fuel would be required. This has an energy equivalent of $17.3 \times 10^9 \text{ BTU}$.

1 - Energy and Resource Recovery from Solid Wastes by Garrett Research and Development Company, Inc.

2 - Assuming 25% moisture content.

Alternative 2B. The analysis of the energy requirements of the County landfill under Alternative 2B is based on the following assumptions:

1. The fuel requirement per ton disposed needed by the utility and water trucks will be the same as calculated for 1975.
2. The quantity of fuel used by the grader will be the same as in 1975.
3. The operating time of the scraper will be reduced by 80%. This reduction in time is because milled refuse does not require daily cover. Therefore, the final requirement is assumed to be 20% of normal operations.
4. It was shown in Appendix C that 4,621 hours of operating time would be required for crawlers and compactors. This is 80% of the operating time required in 1975. Therefore, the fuel requirement will be assumed to be 80% of the 1975 value for this equipment.

Using the following assumptions, the fuel required to operate the landfill was calculated to be 2,070 gallons of gasoline and 55,381 gallons of diesel fuel. This has an energy value of 7.9×10^9 BTU.

City Landfill

Alternative 1A. The energy requirements for the city landfill under Alternative 1A were based on the assumption that the ratio of fuel required per ton of refuse disposed would be the same as the County landfill operation. Using this assumption it was calculated that 902 gallons of gasoline and 40,640 gallons of diesel fuel would be required. This has an energy value of 5.7×10^9 BTU.

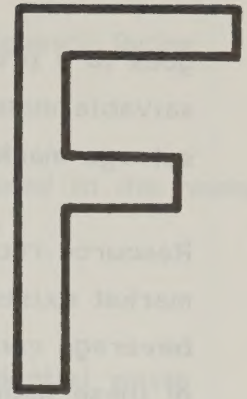
Alternative 2B. The analysis of the energy requirements of the city landfill under Alternative 2B is based on the following assumptions:

1. The fuel per ton disposed used by the utility and water trucks will remain the same as the figure for Alternative 1A.

2. The fuel used by the grader will remain the same as that calculated for Alternative 1A.
3. The operating time of the scrapers will be reduced by 80%. This reduction in time is because milled refuse does not require daily cover. The fuel required is therefore assumed to be 20% of normal operations.
4. It was calculated in Appendix C that 2,404 hours of operating time would be required of crawlers and compactors. It was assumed that each will operate 1,202 hours and that the crawler uses 10 gallons per hour and the compactor uses 8.5 gallons per hour. These figures are based on operating conditions at the County landfill in 1975.

The total fuel used at the landfill was found to be 1,076 gallons of gasoline and 27,259 gallons of diesel. This has an energy value of 3.9×10^9 BTU.

Appendix



Home Separation

DESCRIPTION

In the past, recycling of home-separated items has often been accomplished through the use of recycling centers. A recycling center is an intermediate storage and processing facility designed to accumulate and prepare for transport those salvable materials which are normally discarded as waste. Two different methods of operating these centers are defined as follows:

TYPE A Recycling Center. Citizen separates salvable material from non-salvable at his home and then delivers the salvable material to a recycling center. The agency responsible for operating the center then processes and delivers those materials to salvage markets;

TYPE B Recycling Center. Citizen separates salvable material from non-salvable at his home with pick up by a collector. Two separate collections are then required; one pickup for the salvable and one for the non-salvable. The non-salvable goes to the landfill and the salvable

goes to a processing center. The operating agency then separates the salvable materials into various categories which are then delivered to salvage markets.

Resource recovery in the home is limited to items for which a reliable market exists. At present, market exists for ferrous cans, aluminum beverage containers, glass containers and newsprint. Some preparation of these items is necessary before they are ready for market.

All recycling centers depend upon the willingness of citizens to participate. The efficiency at which the citizens can effectively separate material in the home is a variable which is evaluated in the next section.

QUANTITIES RECOVERED

Waste Composition

It is assumed that only residential waste will be subject to home separation. The percent by weight of salvable items in residential waste is as follows:

Ferrous	6.4%
Non-ferrous	1.3%
Glass	9.8%
Newsprint	9.1%
Total	26.6%

Recovery Rates

The recovery rates for home separation depend on (1) the percentage of an item that is salvable, and (2) the efficiency at which the public can separate the material. The percentage of salvable items that are actually salvable will vary with the item. The following assumptions were used in the analysis. Ferrous cans are 90 percent by weight of all ferrous metal. Aluminum beverage containers are 100 percent of all non-ferrous. Salvable glass is 75 percent by weight of all mixed glass.

100 percent of all newsprint is salvable. A separation efficiency factor of 90 percent will be assumed for all items.

Based on these assumptions the amount of each item recovered in the home is determined as follows:

<u>Ferrous</u>	6.4% of residential waste 90% salvable 90% efficiency factor (90%) (90%) (6.4%) = 5.18% of residential waste
<u>Non-Ferrous</u>	1.3% of residential waste 100% salvable 90% efficiency factor (100%) (90%) (1.3%) = 1.17% of residential waste
<u>Glass</u>	9.8% of residential waste 75% salvable 90% efficiency factor (75%) (90%) (9.8%) = 6.62% of residential waste
<u>Newspaper</u>	9.1% of residential waste 100% salvable 90% efficiency factor (100%) (90%) (9.1%) = 8.19% of residential waste

The total percentage of residential waste that would be recovered in a participating home is 21.16%. This is $(21.16/26.6) \times 100\% = 79.55\%$ of all salvable residential waste. The remaining salvable waste not recovered (20.45%) will proceed through collection and be landfilled.

Participation

All recycling centers depend on the willingness of citizens to participate. Normal participation rates as determined from past operations in the County and nationwide are 10 percent for Type A Centers and 20 to 50 percent for Type B Centers. Analysis of home separation will be based on participation rates of 10 to 25 percent. Plates F-1 and F-2 show how 100 tons of municipal refuse proceeds through home separation, collection and recovery. Plate F-1 shows the flow of the refuse with a home separation participation rate of 10 percent (10 out of 100 homes) and

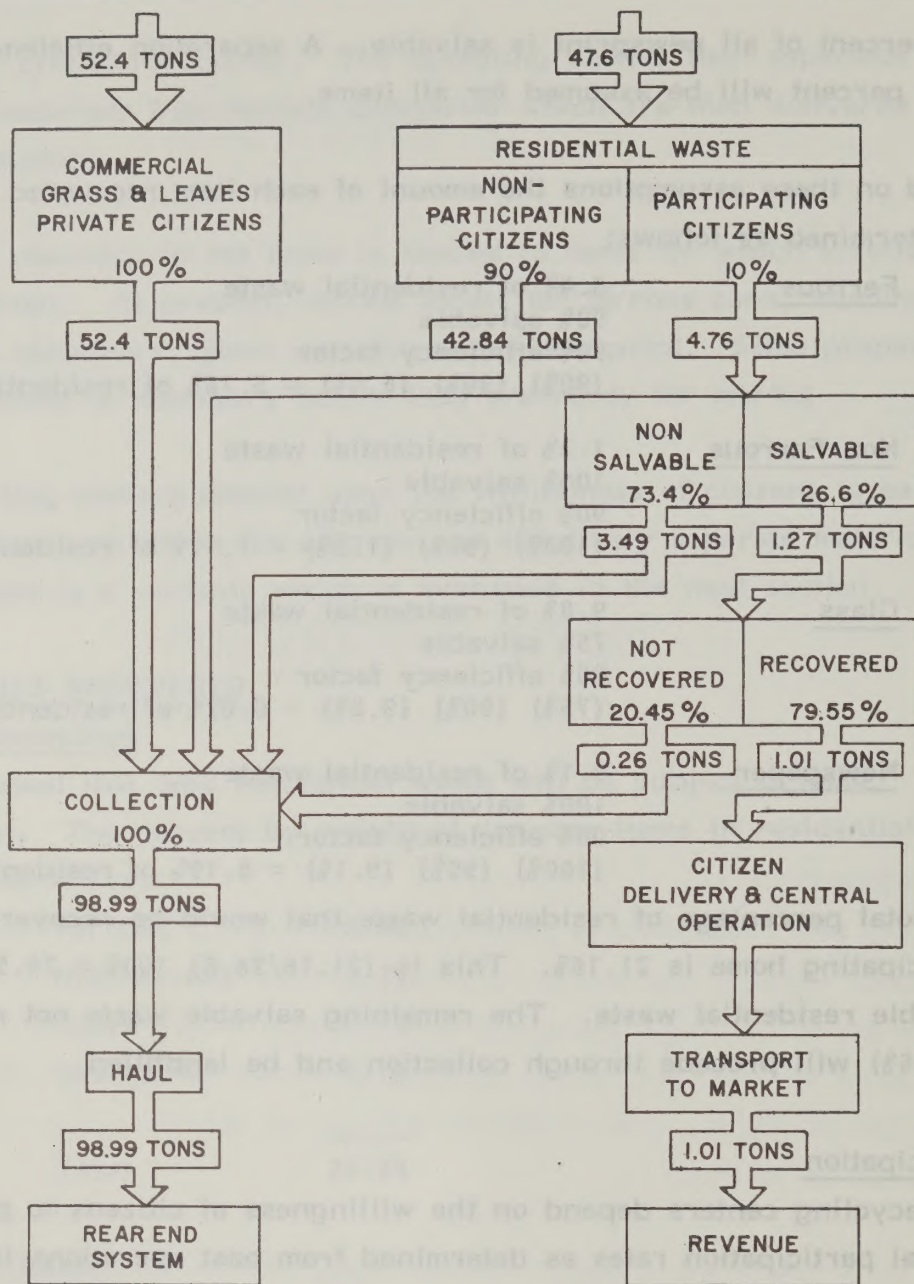


PLATE F-1
FLOW OF ONE HUNDRED TONS OF MUNICIPAL WASTE
AT 10% PARTICIPATION

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

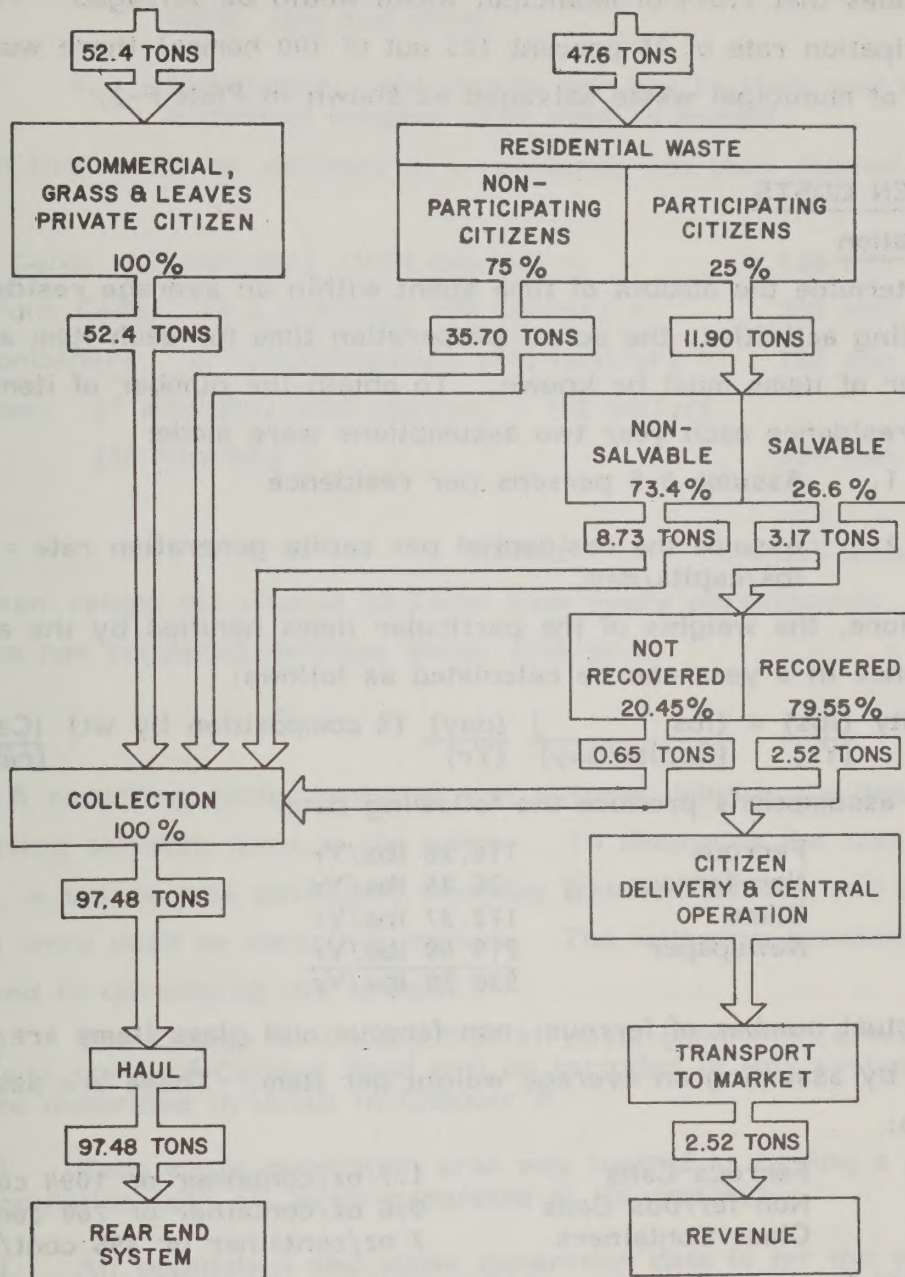


PLATE F-2
FLOW OF ONE HUNDRED TONS OF MUNICIPAL WASTE
AT 25% PARTICIPATION

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

concludes that 1.01% of municipal waste would be salvaged. For a participation rate of 25 percent (25 out of 100 homes) there would be 2.52% of municipal waste salvaged as shown in Plate F-2.

CITIZEN COSTS

Separation

To determine the amount of time spent within an average residence in recycling activities, the actual preparation time for each item and the number of items must be known. To obtain the number of items handled by a residence each year two assumptions were made:

1. Assume 3.5 persons per residence
2. Assume the residential per capita generation rate = 2.05 lbs/capita/day.

Therefore, the weights of the particular items handled by the average residence in a year can be calculated as follows:

$$\text{Quantity } \frac{(\text{lbs})}{(\text{Yr})} = \frac{(\text{lbs})}{(\text{Capita/Day})} \frac{(\text{day})}{(\text{Yr})} (\% \text{ composition by wt}) \frac{(\text{Capita})}{(\text{residence})}$$

These assumptions produce the following data:

Ferrous	116.28 lbs/Yr
Non-ferrous	26.25 lbs/Yr
Glass	173.37 lbs/Yr
Newspaper	214.49 lbs/Yr
	530.39 lbs/Yr

The actual number of ferrous, non-ferrous and glass items are determined by assuming an average weight per item. These are assumed as follows:

Ferrous Cans	1.7 oz/container or 1094 cont/Yr
Non-ferrous Cans	0.6 oz/container or 700 cont/Yr
Glass Containers	7 oz/container or 396 cont/Yr

In order to evaluate citizens time associated with recycling tasks, assumptions were made concerning time spent preparing items for recycling:

1. Ferrous cans - two minutes per can to wash, remove, label flatten and store.
2. Non-ferrous cans - one-half minute to rinse, flatten and store.

3. Glass - two minutes per glass item to rinse, remove label, dry and store.
4. Newspaper - one minute per day to store and ten additional minutes each week to bundle.

The total time spent by members of a residence was then determined to be:

Ferrous Cans:	(2 min/can) (1094 can/yr) =	2,188 min
Non-ferrous Cans:	(0.5 min/can) 700 can/yr) =	350 min
Glass Containers:	(2 min/container) (396 cont/yr) =	792 min
Newspaper:	(1 min/day) (365 day/yr) + (52 wk/yr)	
	(10 min/wk) =	885 min
TOTAL		4,215 minutes

If a citizen values his time at \$2.25/hr then every participating residence has rendered services worth \$158/yr.

Transport

A Type A recycling center requires that citizens provide the means of transporting salvable items to the center. To determine the cost to the citizens, a system was developed whereby transfer stations and operating landfills were used as recycling centers. The following assumptions were used in developing the system:

- 1) The County is divided into 51 waste generation areas. Only those north of Calvine Road will be included in this system. These are described in detail in Chapter 5.
- 2) Each waste generation area was treated as having a discrete population with all waste generated at its centroid.
- 3) All population and waste generation data is for the year 1980.
- 4) Waste generation areas were assigned to transfer stations based on geographic and economic factors.
- 5) Mileage to a transfer station was said to be the mileage from the transfer stations to the centroid of the waste generation area that contained the home, measured along the highway system.

- 6) Cost per ton to transport salvable materials is shown in Plate F-4. The assumptions are detailed in Plate F-3.

The cost to citizens for delivery of home separated materials under alternatives 2A and 2B are summarized in Tables F-1 and F-2 respectively. The tables are read from left to right using "Transfer Station" as the main heading. Transfer stations serve as the citizens' recycling centers. The general public is excluded from using the consolidated processing facility; thus, that facility is not used as a recycling center. The major difference between 2A and 2B for this analysis is that alternative 2A allows general public use of the County landfill, whereas alternative 2B does not. Under the name of each transfer station is a percent figure showing the citizen participation rate. The next two columns show the tons/year of refuse each station will receive and also the tons/year of home salvaged material. The next column is the average mileage, round trip, that any citizen would have to deliver materials to a given recycling center. The last two main headings are the cost to the citizens in dollars/ton and dollars/day, to transport the home-separated items to the recycling center. These last two main headings are split further into two separate columns. One column lists costs if no wages were paid for the citizens' time and the other lists the cost to transport if wages were paid. The data for each station should be read according to the following example: The Northeast Transfer Station received 53,663 tons/year of refuse. At a participation rate of 10 percent, 3.1 tons/day of home-salvaged material will be delivered by citizens. The citizens will have traveled an average round trip of 9.1 miles at a cost of \$92/ton, if their time has value or \$50/ton if their time is assumed free. The citizens will deliver the 3.1 tons of salvaged material at a total cost of \$156/day if their time is free and \$289/day if it is not.

Operating Agency Costs

A program with Type B recycling centers would involve a cost to the operating agency for collections of salvaged materials. Because there are no working programs, these costs were estimated. The estimate

Let T_o = time to load and unload (hrs.)
 V = average velocity (mph)
 W = value of citizens time (\$/hr)
 T = tonnage transported/month (tons)
 D = one way distance (miles)
 C = cost/ton transported (\$/ton)
 C_o = vehicle cost/mile (\$/mile)

Then the expression used for computing cost is:

$$C = \frac{\left[T_o + \frac{2D}{V} \right] W + 2C_o D}{T}$$

Assumptions:

- (1) 10 minutes is allowed for the citizens to load and unload their materials (T_o)
- (2) they average 30 mph while in transit (V)
- (3) the minimum wage is \$2.25 per hour (W)
- (4) the citizens transport 46 lbs. of material once a month to the closest recycling center (T)
- (5) vehicle costs are 15 cents per mile (C_o)

Then:

No Wages $C = \frac{0.30D}{0.023} = \underline{13.04D}$

Wages $C = \frac{\left[\frac{1}{6} + \frac{2D}{30} \right] 2.25 + 0.3D}{0.023} = 16.30 + 19.55D$

These cost functions are displayed in Figure 4

PLATE F-3

COST PER TON FOR CITIZENS TO
 TRANSPORT SALVABLE MATERIALS

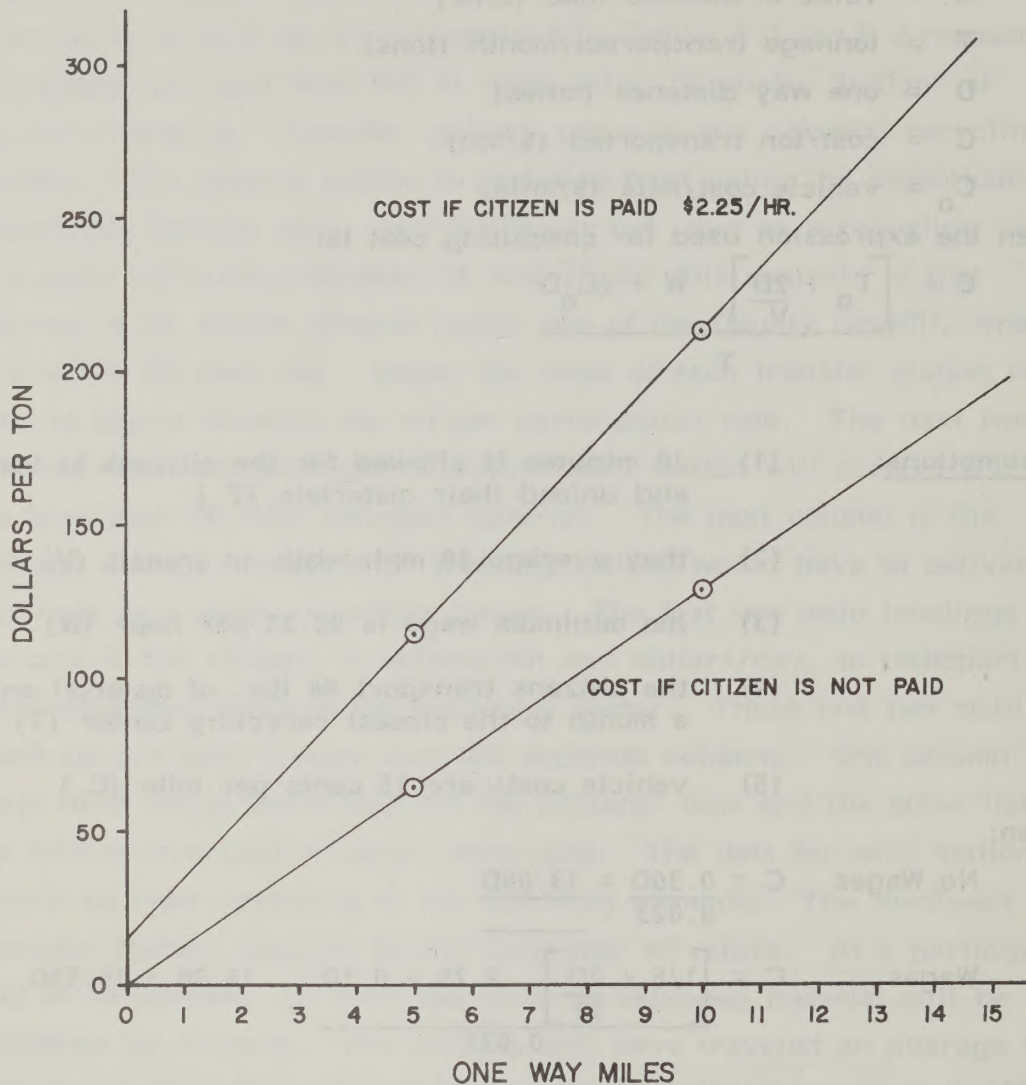


PLATE F-4
COST PER TON FOR CITIZEN TO TRANSPORT SALVABLE MATERIALS

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

TABLE F-1
COST TO CITIZEN FOR DELIVERY OF
HOME SEPARATED MATERIALS - ALTERNATIVE 2A

TRANSFER STATION	TONS PER YEAR ¹	TONS RECOV'D PER DAY ²	AVERAGE MILEAGE ³	AVERAGE COST TO CITIZEN FOR TRANSPORT			
				DOLLARS/TON		DOLLARS/DAY	
				No Wages	Wages	No Wages	Wages
North East 10%	53,663	3.1	9.1	50	92	156	284
North East 25%	53,663	7.7	9.1	50	92	390	711
North Area 10%	89,968	5.2	10.4	63	110	328	577
North Area 25%	89,968	13.1	10.4	63	110	821	1,442
Fruitridge 10%	103,976	6.0	10.6	72	124	431	745
Fruitridge 25%	103,976	15.0	10.6	72	124	1,078	1,864
County Landfill 10%	15,826	0.9	17.9	142	229	131	211
County Landfill 25%	15,826	2.3	17.9	142	229	326	526
TOTAL 10%	263,433	15.2	12.0	69	119	1,046	1,817
TOTAL 25%	263,433	38.1	12.0	69	119	2,615	4,544

1. 1980 Data

2. Delivered by citizen to facility

3. Round trip

TABLE F-2
COST TO CITIZEN FOR DELIVERY OF
HOME SEPARATED MATERIALS - ALTERNATIVE 2B

TRANSFER STATION	TONS PER YEAR ¹	TONS RECOV'D PER DAY ²	AVERAGE MILEAGE ³	AVERAGE COST TO CITIZEN FOR TRANSPORT			
				DOLLARS/TON		DOLLARS/DAY	
				No Wages	Wages	No Wages	Wages
North East 10%	63,455	3.7	9.7	58	104	214	381
North East 20%	62,455	9.2	9.7	58	104	535	951
North Area 10%	89,968	5.2	10.4	63	110	328	577
North Area 25%	89,968	13.2	10.4	63	110	821	1,442
Fruitridge 10%	110,010	6.4	11.3	74	127	467	805
Fruitridge 20%	110,010	15.9	11.3	74	127	1,167	2,013
TOTAL 10%	263,433	15.3	10.5	66	116	1,009	1,763
TOTAL 25%	263,433	38.2	10.5	66	116	2,525	4,406

1. 1980 data

2. Delivered by citizen to facility

3. Round trip

was based on a study conducted in Los Angeles. They conducted several tests to find collection costs per ton versus pounds per collection point. The collection costs in Los Angeles are not the same as in Sacramento County, thus the costs determined in the Los Angeles study were proportionally changed to reflect Sacramento County data. These costs are shown in Plate F-5.

The costs do not include haul or disposal costs.

<u>Pounds Per Collection Point</u>	<u>Percent of Normal Collection</u>	<u>Collection Cost \$ Per Ton</u>
58.0	100%	\$ 29.16*
43.5	75%	33.00
29.0	50%	40.00
14.5	25%	51.00

* Reference: Phase I Interim Report; Bartle Wells Associates

If the physical aspects of collection of recyclables from citizens' homes is assumed to be the same (such as crew size, vehicle size, salaries, etc.) as normal collection, the once-a-week collection of recyclables by a public agency would cost slightly more than \$51.00/ton when collected weekly (10.16 pounds/week of recyclables available for collection.) If collection by a public agency is once a month, then the collection cost is slightly less than \$33.00 per ton (46 pounds/month of recyclables available for collection). If the time of citizens participating in home separation programs has value, then separate collection by an agency would be the least-cost method between these two alternatives by a wide margin (see Tables F-1 and F-2). However, if the citizens' time is assumed to be zero, then weekly collection of recyclables by an operating agency would cost nearly the same as homeowner separation (see Tables F-1 and F-2). When collection of recyclables is monthly, then collection by an operating agency would be the least-cost system.

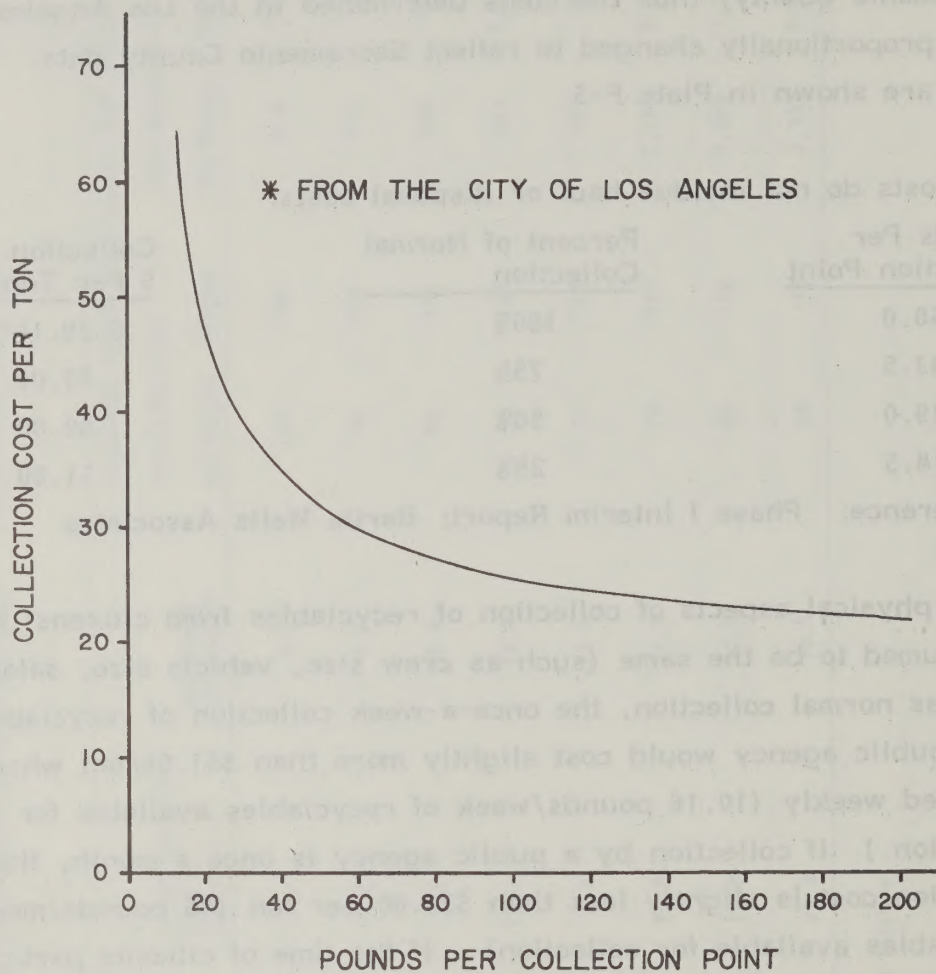


PLATE F-5
RESIDENTAL REFUSE COLLECTION COSTS*

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

The preceding comments were based on the assumption that consolidated processing was not incorporated into the solid waste management system.

Plate F-6 shows that a participation rate of 100 percent will produce an approximate reduction of 10% of waste being disposed.

REVENUE

Table F-3 displays the value of separated salvable material. The last column shows that the salvable portion of residential refuse is worth \$30.69/ton if separated. This does not take into consideration materials that are salvaged by other means. The Boy Scouts and other groups regularly collect paper, aluminum and bottles to help finance their activities. The effect of these drives on a regular recycling program cannot be determined, but some loss in revenue to the County results.

EFFECTS OF HOME SEPARATION ON CONSOLIDATED PROCESSING

Waste Composition

Home separation will alter the composition of the waste stream in such a way that the amount of salvable items available for processing will be reduced. In order to study the effect of home separation on central processing, a program of central processing operating alone, home separation alone, and the two working in unison must be analyzed. All systems will be analyzed using 100 tons of municipal refuse as the input.

Consolidated Processing

The refuse subject to consolidated processing is of the following composition:

	<u>Percent of Weight of Municipal Waste</u>
Ferrous	7.2%
Non-ferrous	1.6%
Glass	6.9%
Newspaper	4.8%

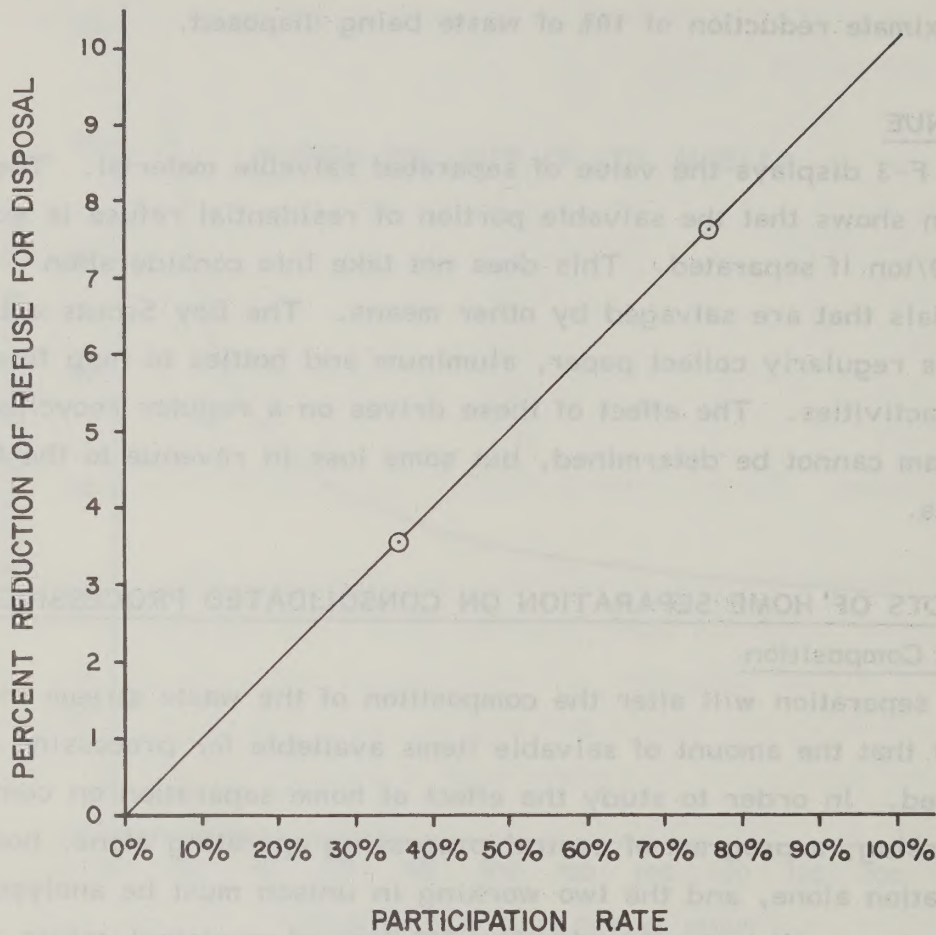


PLATE F-6
MATERIAL RECOVERED FROM RESIDENTIAL
WASTE USING HOME SEPARATION

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

TABLE F-3

VALUE OF SALVABLE PORTION OF RESIDENTIAL WASTE

	PERCENT OF TOTAL REFUSE	PERCENT OF SALVABLE REFUSE	MARKET VALUE \$/TON	VALUE/TON SALVABLE REFUSE
FERROUS	6.4%	24.0%	\$ 25	\$ 6.00
ALUMINUM	1.3%	4.9%	\$300	\$14.70
GLASS	9.8%	26.9%	\$ 15	\$ 5.54
NEWSPAPER	9.1%	34.2%	\$ 13	\$ 4.45
TOTAL	26.6%	100%	-	\$30.69

Percent by Weight (cont.)

Corrugated	6.4%
Plastic	1.7%
Other	<u>71.4%</u>
TOTAL	100%

The waste will be subject to hand salvage and mechanical processing. The amount of material recovered is determined by the following recovery factors:

	<u>Hand Separation Recovery Rates At The Processing Facility</u>	<u>Mechanical Processing Recovery Rate</u>
Ferrous	15.3%	100%
Non-ferrous	6.3%	50%
Glass	0 %	50%
Newspapers	0 %	0%
Corrugated	20.0%	0%
Plastic	50.0%	0%

Hand separation recovery rates for ferrous and non-ferrous were derived from existing programs at the North Area Transfer Station. The rates for corrugated and plastic are based on staff studies. The mechanical processing recovery rates apply to material left after hand separation.

The amount of material salvaged from 100 tons of municipal refuse is found by first determining the quantity of each item, then the recovery rates are used to determine the percent of each item that will be recovered.

$$\left[\begin{array}{c} 100 \text{ Ton} \\ \text{Municipal} \\ \text{Waste} \end{array} \right] \left[\begin{array}{c} \% \\ \text{Compo.} \end{array} \right] \left[\left(\begin{array}{c} \text{Hand} \\ \text{Separation} \\ \text{Eff. (\%)} \end{array} \right) + \left(\begin{array}{c} \text{Hand} \\ 100\% - \text{Separation} \\ \text{Eff. (\%)} \end{array} \right) \left(\begin{array}{c} \text{Mechanical} \\ \text{Separation} \\ \text{Eff. (\%)} \end{array} \right) \right] = \begin{array}{l} \text{Tons Re-} \\ \text{covered/} \\ 100 \text{ Tons} \\ \text{of Muni-} \\ \text{cipal Waste} \end{array}$$

	<u>Tons Recovered/100 Ton Municipal Waste</u>
Ferrous	7.20
Non-ferrous	0.85
Glass	3.45
Newspaper	0.00
Corrugated	1.28
Plastic	<u>0.85</u>
TOTAL	13.63

Home Separation

Separation of recoverable items in the home is limited to residential waste. Residential waste makes up 47.6 percent of municipal waste. Therefore, out of 100 tons of municipal waste only 47.6 tons will be subject to home separation. The composition and recovery rates are listed under the heading "Quantities Recovered." Assuming 100 percent citizen participation, the following quantities would be salvaged:

	<u>Recovery Rate</u>	<u>Tons Recovered</u>
Ferrous	5.18%	2.46
Non-ferrous	1.17%	0.56
Glass	6.62%	3.15
Newspaper	<u>8.19%</u>	<u>3.90</u>
TOTAL	21.16%	10.07

Consolidated Processing with Home Separation (Maximum Effect)

The percentage of salvable material entering consolidated processing will be decreased because of the amount removed during home separation. The quantity of each item that is available for recovery from 100 tons of municipal waste is as follows:

	<u>Salvable Material In 100 Tons of Municipal Waste</u>	<u>Amount Removed By Home Separation</u>
Ferrous	7.20 tons	2.46 tons
Non-ferrous	1.60 tons	0.56 tons
Glass	6.90 tons	3.15 tons

	<u>Salvable Material In 100 Tons of Municipal Waste</u>	<u>Amount Removed By Home Separation</u>
Newspaper	4.80 tons	3.90 tons
Corrugated	6.40 tons	0 tons
Plastic	1.70 tons	0 tons

	<u>Material Available at Consolidated Processing</u>
Ferrous	$7.20 - 2.46 = 4.74$ tons
Non-ferrous	$1.60 - 0.56 = 1.04$ tons
Glass	$6.90 - 3.15 = 3.75$ tons
Newspaper	$4.80 - 3.90 = 0.90$ tons
Corrugated	$6.40 - 0 = 6.40$ tons
Plastic	$1.70 - 0 = 1.70$ tons

The material entering consolidated processing will be subject to the same recovery rates listed in the "Consolidated Processing" section.

The amount of material recovered at consolidated processing and the total amount recovered by both recovery systems follows:

	<u>Amount of Material Recovered Through Consolidated Processing</u>	<u>Total Tons of Material Recovered</u>
Ferrous	4.74	7.20
Non-ferrous	0.55	1.11
Glass	1.88	5.03
Newspaper	0.00	3.90
Corrugated	1.28	1.28
Plastic	<u>0.85</u>	<u>0.85</u>
TOTAL	9.30	19.37

The quantities recovered with the use of home separation and consolidated processing is greater than using each recovery method individually.

The increase in recovered tonnage for both systems is 42% greater than consolidated processing and 92% greater than home separation. The quantities recovered through home separation were based on 100 per-cent citizen participation. Plates F-7 and F-8 show the flow of 100 tons of

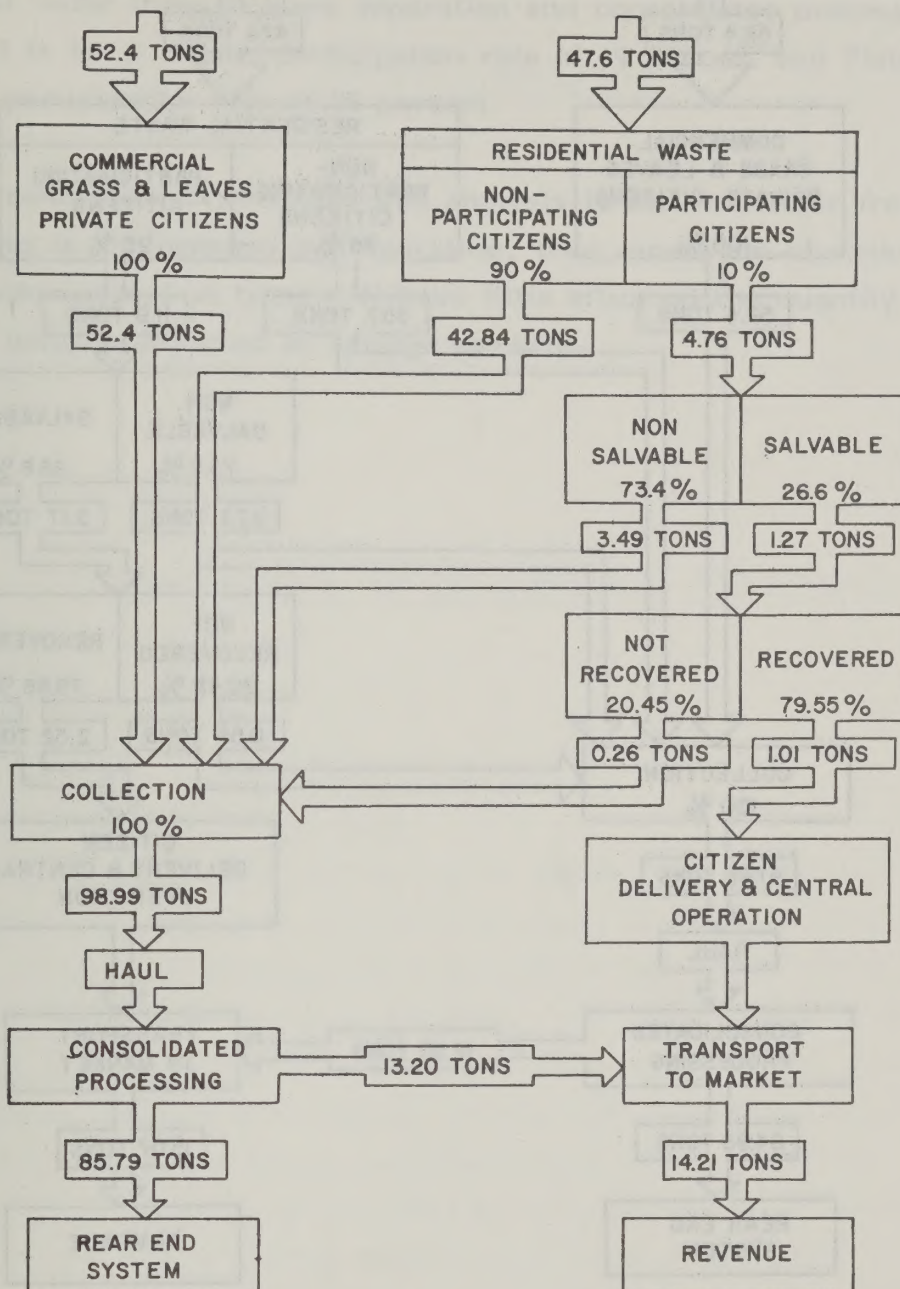


PLATE F-7
FLOW OF ONE HUNDRED TONS OF MUNICIPAL WASTE
AT 10% PARTICIPATION

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

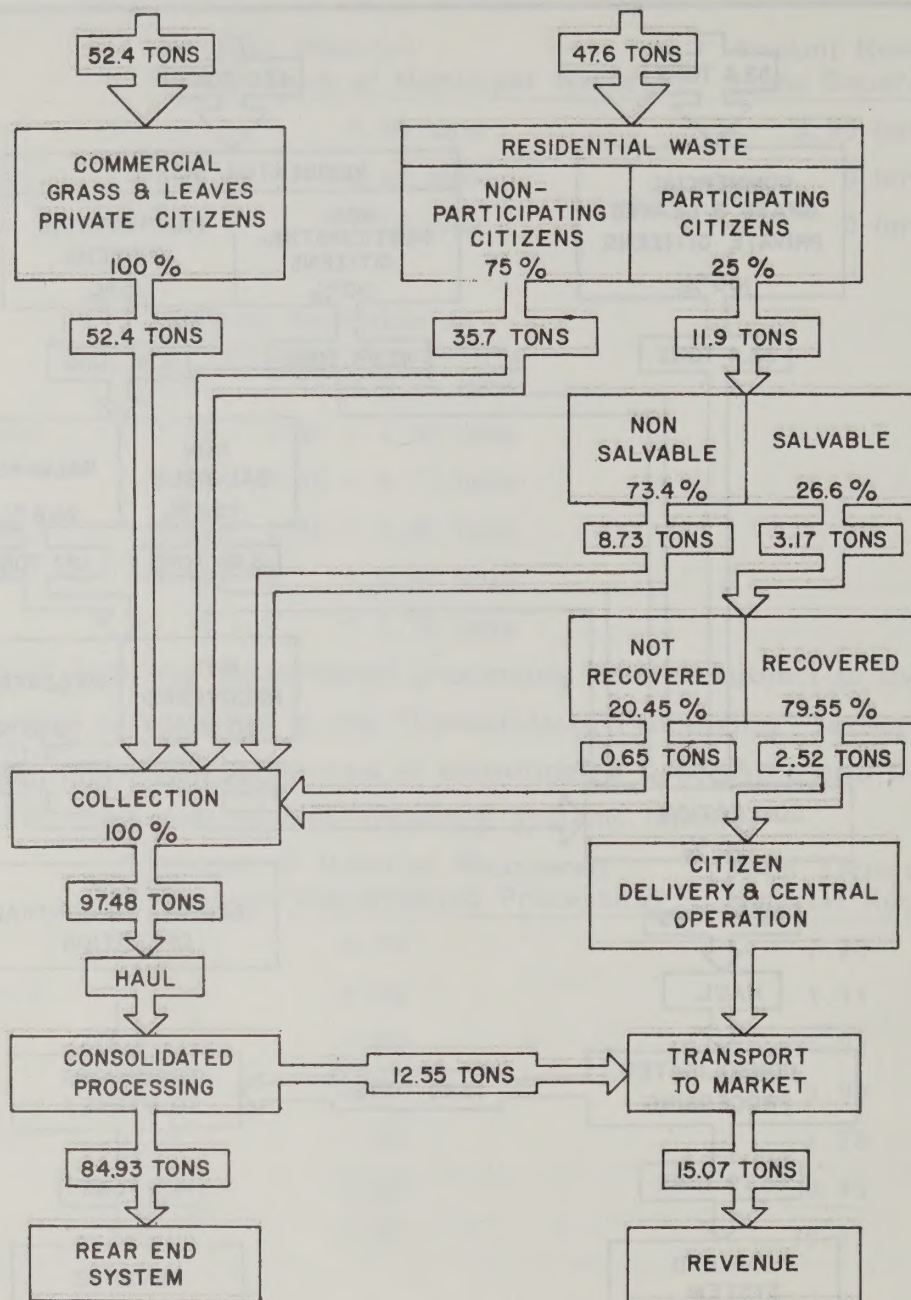


PLATE F-8
FLOW OF ONE HUNDRED TONS OF MUNICIPAL WASTE
AT 25% PARTICIPATION

SOURCE: SACRAMENTO COUNTY
SOLID WASTE MANAGEMENT DIV.

municipal waste through home separation and consolidated processing. Plate F-7 is for a citizen participation rate of 10 percent and Plate F-8 is for a participation rate of 25 percent.

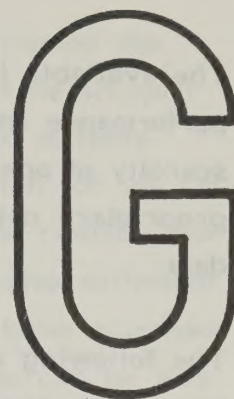
A major conclusion drawn from this analysis is that whenever front-end processing is implemented and operating, then separation of material (except newspaper) at home will have little effect on the quantity of material actually diverted to salvage markets.

Solid Waste Processing Systems

EXISTING LANDS OF ACQUISITION

The first step in the study of alternative solid waste systems begins with an inventory of existing technology concerning solid waste processing systems. Processing refers to those operations and systems which are performed prior to recovery or disposal. The objectives of processing are to reduce the volume of waste, to separate materials for recovery, and to prepare waste for disposal. All current processing technology is derived from technology developed within other industries. Many problems have been encountered in applying existing technology to solid waste because of the lack of unique properties of waste materials. The processing, material separation, recovery, energy conversion, and recycling of solid waste and related processing systems. Processing systems include mechanical, biological, chemical, and physical processes. Existing processing systems include:

Appendix



Solid Waste Processing Systems

EXISTING LEVELS OF PROCESSING

The first step in the study of alternative processing systems begins with an inventory of existing technology concerning waste processing techniques. Processing refers to those procedures and systems which prepare solid waste for recovery or disposal. The objectives of processing are either direct salvage of a material, volume reduction, or production of a new manufactured by-product. All current processing techniques have evolved from technology developed within other industries. Many problems have developed in applying existing technology to solid wastes because of the lack of unique properties of waste components. Size reduction, material separation, recovery, energy conversion, and recycling of solid waste are typical processing options. Particular systems include composting, incineration, steam production, pyrolysis, milling, magnetic separation, etc.

The available literature was found to be seriously deficient concerning performance and cost data for existing or developing processes. The scarcity of operating facilities, unreliability of data published, and the proprietary nature of many techniques made it difficult to derive reliable data.

The following is a discussion of state-of-the-art development of various processing systems.

Landfilling

Although landfilling is not a processing system or procedure it warrants mentioning because of its practicality and subsequent widespread use.

A sanitary landfill, when properly operated, offers the lowest cost system on a unit basis whenever large amounts of refuse are available for disposal. Because of this, landfilling raw refuse is the most commonly used method of waste disposal. Sacramento County landfills its raw refuse (after some ferrous metal recovery).

Landfill With Volume Reduction

Landfilling processed waste has certain benefits over burying raw refuse. Large voids are prevented, greater compaction can be achieved, fires are nearly impossible, vectors are minimized and daily cover of the refuse with earth may be eliminated. There is a corresponding increase in life of the landfill through these benefits. Houston, Texas, (System 1) has been landfilling processed waste since 1971. Landfilling processed waste should cost in the neighborhood of \$1.00/ton.

There are three processes available to achieve volume reduction: Baling, milling, and incineration.

Baling. Baling entails compacting either milled or unmilled refuse into dense bales. In addition to reducing volume, baling also facilitates

easier and more economical transport of refuse. For this reason the benefits of baling are only fully realized if the refuse must be shipped long distances or if the community has a system of transfer stations. From a study done by the American Public Works Association for the City of Chicago, it was found that it is not necessary to mill the refuse prior to baling if compaction pressures exceed 1,500 psi. It is also estimated in the study that the cost (which includes depreciation of baler purchase price, power, and maintenance) of baling non-milled refuse can be less than 40 cents per ton (1970 dollars).

Milling. A processing option which is technologically feasible today is milling. Milling, or shredding, is a size reduction process designed to produce a uniform waste particle size.

Milling can be implemented wherever large amounts of waste are brought together. Processes such as composting, pyrolysis, some recovery methods and other large scale recovery systems require milling. Costs range from \$2.50 to \$6.00 per ton for standard milling operations. Detailed cost estimates for Sacramento County are presented in Chapter 9.

Incineration. This process has been technologically feasible for many years. Processes incorporating resource recovery from incineration include those which produce steam, extract metals and glass from incinerator residue, or directly drive a turbine from escaping exhaust gases to generate electricity. It is technically feasible to generate steam. The other processes have yet to be demonstrated on a full scale basis. Some examples of feasible systems are 1) Combustion Power Co. CPU 400 (System 2); 2) Chicago Northwest Incinerator (System 3); 3) Hamilton, Ontario, Incinerator (System 4); 4) Nashville Heating & Cooling (System 5), 5) Consumat^R (System 6). Unit operating costs for these range from \$4.00 to \$13.00 per ton.

Materials Recovery

This includes those processes which mechanically separate the refuse into its constituent components. Some examples of these types of systems are 1) Black-Clawson Hydropulping (System 7); 2) Ames, Iowa, Resource Recovery (System 9); 3) Incinerator Residue Separation - Cowell, Massachusetts (System 10). Unit operation costs for these range from \$9.00 to \$14.00 per ton. The hydropulper is technically feasible. However, separating materials from incinerator residue has met with technological problems.

This solid waste management plan recommends a system which includes ferrous, glass, and aluminum recovery.

Ferrous Recovery. The ferrous component can be extracted from solid waste by magnetic separation. This procedure is simple and the technology is available. Processed or unprocessed waste can undergo magnetic separation, however, greater efficiency is obtained with processed waste. A magnetic separation system can operate at a profit if markets are nearby.

Glass and Aluminum Recovery. There are several ways to extract glass and aluminum from solid waste. Although the particular glass and aluminum recovery process to be incorporated in Sacramento County's system will be determined in the design phase of development, it is felt that a description of one particular process will provide a better understanding of the recommended system. The process chosen for an example is one developed by Garrett Research and Development (GR & D) of La Verne, California.

The Garrett Research and Development (GR & D) system is conceptually described in two parts. The first part, the glass recovery process, was developed by GR&D. A technique known as froth flotation uses a chemical reagent which causes the previously air-classified and ground glass to

attach itself to air bubbles generated in a froth flotation cell. Non-glass impurities are left behind. This process recovers about 70% of the glass contained in the as-received refuse as a 99.7% pure product which, according to GR&D, commands a good price in the glass container manufacturing market.

The second part also developed by GR&D is the aluminum recovery process called the GR&D RECYC-AL process. This consists of one or more linear induction motors (LIM) which are positioned just beneath a non-conductive conveyor belt driven by a variable speed drive. The heavy fraction of the air classification process is fed from a hopper onto the conveyor belt. The LIM's operate on an alternating-current, variable-frequency power source. As the refuse containing aluminum passes over the LIM, eddy currents are induced in the pieces of aluminum, producing a magnetic field of opposite polarity to that field produced by the LIM. Because magnetic fields of the opposite polarity will attract, the resulting magnetic force causes the aluminum pieces to change direction very rapidly, and they are projected toward the edge of the conveyor belt. A baffle located at the edge of the belt traps the aluminum, which then flows to a product bin. Nearly 60% of the aluminum present in the as-received refuse was recovered in pilot tests using a two- to four-tons-per-hour pilot machine. Refuse remaining after the glass and aluminum separation process would be landfilled, although further tests might show promising results in recovering other non-ferrous metals from the residue.

Preliminary estimates supplied from GR&D state that a 1500-ton-per-day system would require a capital expenditure of \$4,200,000. Operating costs after receiving benefit from sale of glass and aluminum are near "break even" for the glass and aluminum separator process.

For the consolidated processing system discussed in Chapter 9, the major labor effort anticipated would be maintenance of the milling units. Seventeen employees are projected for maintenance and operation of the proces-

sing facility. Salaries for this labor amount to \$340,000 per year or approximately 20% of the \$1,740,000 annual estimated expenses.

Energy Recovery

The recent energy crisis this nation has experienced has focused thought on producing energy from refuse. Many systems have been proposed but few have actually demonstrated feasibility for large scale systems. Many have not survived the pilot state. Steam production for direct sale or used indirectly to produce electricity is the only major system which is proven to be technically feasible and for which a readily definable market exists. All the systems listed under incineration include steam production. No other system has passed the test of time. However, new processes are being developed which might demonstrate a new technology, but these will not be available prior to 1980.

Fuel Recovery.

These operations include those processes which shred incoming solid waste and then either pyrolyze it or have it undergo further processing to yield solid fuel. Pyrolysis is technically feasible today and shows promise of becoming a practical refuse processing system. Several pilot projects across the nation are currently testing various means of pyrolyze waste. Some examples of these types of systems are 1) Garrett Pyrolysis (System 12); 2) Union Carbide Purox (System 13); 3) Monsanto Landguard (System 14); 4) Torrax (System 15); 5) X-50 Pyrolysis (System 17). Unit operating costs for these systems range from \$11.20 to \$15.00 per ton. Pyrolysis requires more study but is further along than other developing technologies. Large scale pyrolysis systems will be coming on line in the near future.

Producing solid fuel from refuse is also technically feasible today. Some examples of these types of systems are 1) St. Louis, Missouri, Supplemental Fuel Project (System 18); 2) East Bridgewater Resource Recovery (System 19); 3) Garrett Supplementary Fuel (System 20); 4) Sira Fuel

Pellets (System 21). Unit operating costs for these systems cannot be determined due to insufficient cost data. Processes such as methane production, methanol production or ammonia production are in an infant state in terms of development.

Composting.

Composting is technically feasible. The operating cost of composting varies from \$6.50 per ton to over \$15.00 per ton. The Varro Composting System (System 22) has been operating successfully on a regular basis. The major problem with composting systems is the lack of guaranteed markets. Financing for major systems might be by revenue bonds and this would require a contractual relationship for sale of the compost. This does not appear to be forthcoming.

Lack of market for compost should cause it to not be viable. The first step to developing a system which includes composting would be to establish contracts for sale of compost which would be produced. With this guarantee, system planning could become more detailed.

The succeeding pages of this appendix contain the description, cost data, and block diagrams for most of the major existing or developing processing systems.

TABLE G-1
SUMMARY OF NATIONWIDE RESOURCE RECOVERY SYSTEMS

	Name of Process	Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day	Materials Recovered	Status of Operation
1	Houston Transfer Station	N.A.	N.A.	N.A.	N.A.	500	Paper Ferrous	Operational 1971
2	Combustion Power Co. CPU-400	\$13.00	\$3.00	\$10.00	24	1,000	Ferrous Aluminum Glass Electricity	80 Ton Pilot Plant 1973
3	Chicago North West Incinerator	\$ 7.20	\$7.20	NONE	23	1,400	Ferrous Steam	Operational 1973
4	Hamilton Ontario Incinerator	\$ 4.00	\$4.00	NONE	83	600	Ferrous Steam	Operational 1972
5	Nashville Heating & Cooling System	N.A.	N.A.	N.A.	17	720	Ferrous Glass Slag Steam & Refrigeration	Operational 1974
6	Consumat ^R U.S. Recycle Corp.	N.A.	N.A.	N.A.	0.185	20	Steam Ferrous Aluminum Glass	Operational

TABLE G-1 (Continued)

	Name of Process	Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day	Materials Recovered	Status of Operation
7	Black Clawson Hydropulping	\$14.10	\$8.60	\$ 5.50	3	150	Ferrous Glass Aluminum Wood Plastic Paper Fiber	Operational 1971
8	Front End Recovery System Cal S.W.M. Board	\$ 6.30	-\$2.80	\$ 9.10	8	1,500	Ferrous Tin	Based on Studies
9	Ames, Iowa S.W. Resource Recovery System	\$11.90	\$2.90	\$ 9.00	5	400	Ferrous Aluminum Glass Dry Fuel	Based on Studies Operational in 1975
10	Incinerator Residue Separation	N.A.	N.A.	N.A.	N.A.	N.A.	Ferrous Aluminum Copper/ Glass Aggregate	Pilot Plant
11	Refuse Energy System	N.A.	N.A.	N.A.	31	1,500	Filler Material <u>Steam</u>	Under Construction

TABLE G-1 (Continued)

	Name of Process	Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day	Materials Recovered	Status of Operation
12	Garrett Pyrolysis System	\$13.30	\$ 3.10	\$10.20	19	1,000	Ferrous Glass Aluminum Char <u>Oil</u>	4 Ton Pilot Plant 1972 - 74 Full Scale 1976
13A	Union Carbide Purox System	\$ 7.80	\$ 3.80	\$ 4.00	10	1,000	Ferrous Glass Slag <u>Gas</u>	5 Ton Pilot Plant Full Scale
13B	Methanation	\$14.90	\$ 6.70	\$ 8.20	25	1,000	Ferrous Glass Slag <u>Gas</u>	N.A.
14	Monsanto Landguard System	\$13.80	\$ 2.60	\$11.20	15	1,000	Ferrous Glass Char <u>Gas or Steam</u>	35 Ton Pilot Plant Full Scale 1974
15	Torrax System	\$15.00	\$15.00	NONE	2	75	Ferrous Glass Slag	Pilot Plant 1971 Full Scale 1973
16	All-American Enviro-Cont System Delaware	N.A.	\$15.20	N.A.	14	500	Ferrous Glass Aluminum Paper Dry Fuel or Compost	Design Stage

TABLE G-1 (Continued)

TABLE G-1 (Continued)

	Name of Process	Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day	Materials Recovered	Status of Operation
17	X-50 Pyrolysis System	N.A.	\$ 3.11	N.A.	7.2	500	Low BTU Fuel Gas Electricity	2 TPD Pilot Plant
18	Union Electricity St. Louis	\$ 6.00	\$ 0.80	\$ 5.20	3.0	650	Ferrous Steam	Operational 1972
These costs do not reflect 2/3 funding of project by EPA.								
19	East Bridge -Water Resource Recovery System	N.A.	N.A.	N.A.	10	1,200	Ferrous Eco Fuel	Operational 1973
20	Garrett Supplementary Fuel and Resource Recovery	N.A.	N.A.	N.A.	30	1,500	Ferrous Aluminum Glass Supp. Fuel	Under Construction
21	Sira Fuel Pellets	N.A.	N.A.	N.A.	N.A.	N.A.	Ferrous Aluminum Glass Plastic	7-10 Tons/Hr Pilot Plant
22	Varro Composting Process	N.A.	N.A.	N.A.	N.A.	100	Ferrous <u>Compost</u>	Operational over 10 Years

System 1: Houston Transfer Station
Resource Recovery Site
Browning - Ferris Industry

A. Type of System: Landfill (500 TPD)

1. Hand paper separation
2. Shredder
3. Paper bailer
4. Magnetic separator

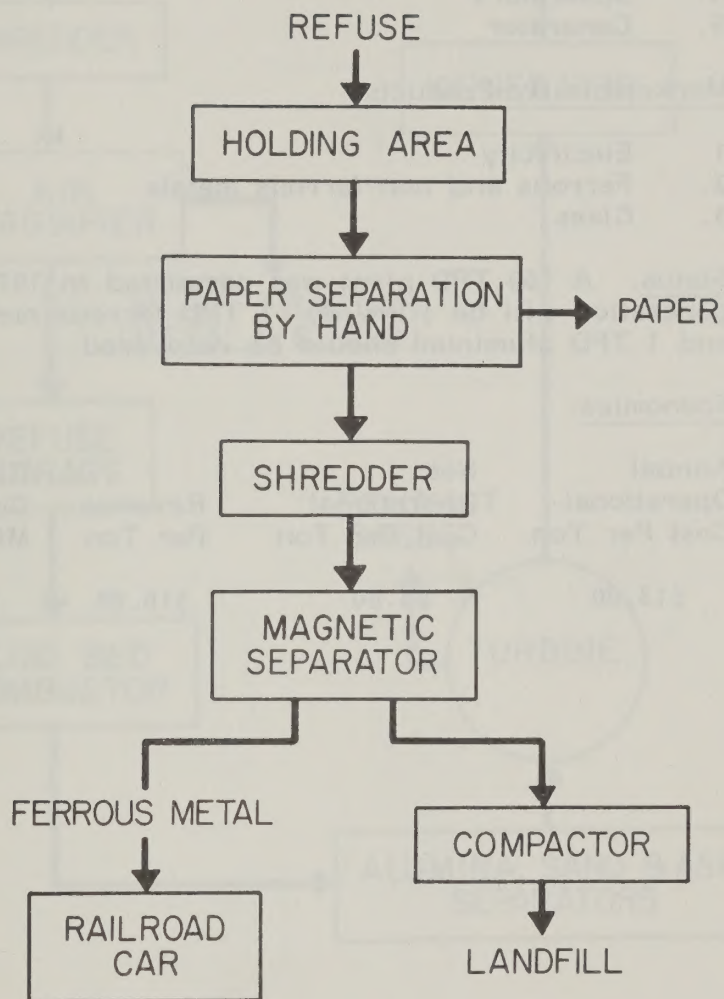
B. Marketable By-Products:

1. Paper
2. Ferrous metals

C. Status: In operation since 1971, processes 500 TPD, 8-hour shift. Another 8-hour shift is to be added. If economically feasible, they will add aluminum and glass recovery.

D. Economics:

None available



SYSTEM I
LANDFILLING PROCESSED WASTE

System 2: CPU - 400 Pilot Plant
Menlo Park, California

A. Type of System: Incineration for turboelectric generation

1. Shredder
2. Air classifier
3. Fluid Bed incinerator
4. Separators
5. Generator

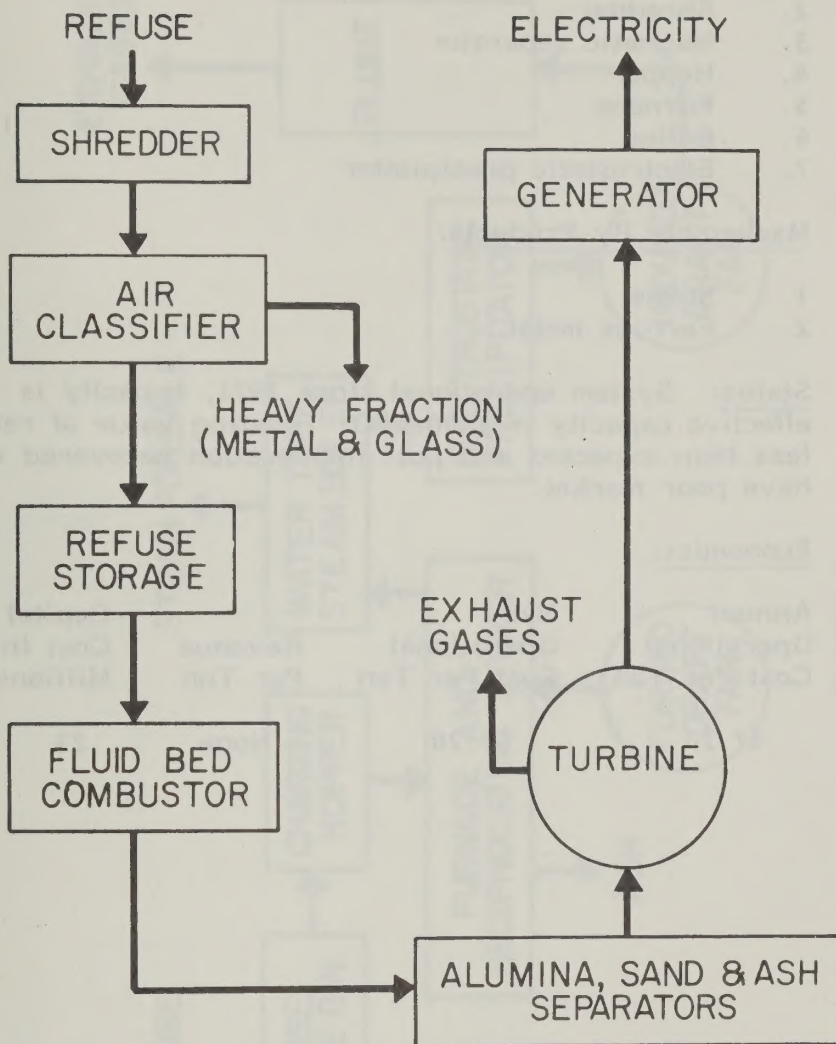
B. Marketable By-Products:

1. Electricity
2. Ferrous and non-ferrous metals
3. Glass

C. Status: A 100 TPD plant was completed in 1973. Expected generation will be 1 mw/d. 7 TPD ferrous metals, 8 TPD glass, and 1 TPD aluminum should be recovered.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost in Millions	Capacity Tons Per Day
\$13.00	\$3.00	\$10.00	24	1,000



SYSTEM 2
CPU - 400 PILOT PLANT

System 3: Chicago Northwest Incinerators

A. Type of System: En Masse Incinerator

1. Storage bin
2. Shredder
3. Magnetic separator
4. Hopper
5. Furnace
6. Boiler
7. Electrostatic precipitator

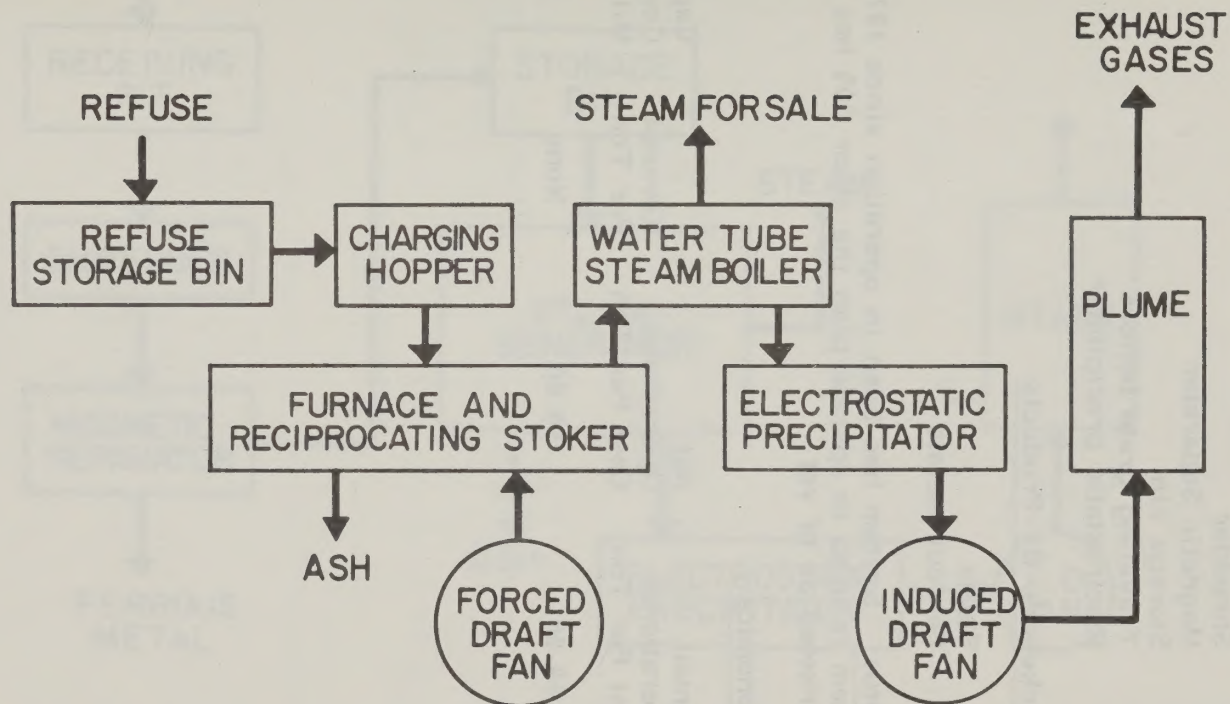
B. Marketable By-Products:

1. Steam
2. Ferrous metal

C. Status: System operational since 1971, capacity is 1600 TPD, effective capacity is 1400 TPD. Heating value of refuse is less than expected and post-incineration recovered metals have poor market.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$7.20	\$7.20	None	23	1,400



SYSTEM 3
CHICAGO NORTHWEST INCINERATOR

System 4: Hamilton Incinerator, Hamilton, Ontario

A. Type of System; Thermal Process

1. Shredder
2. Magnetic Separator
3. Storage bin
4. Traveling grate boilers
5. Electrostatic precipitator

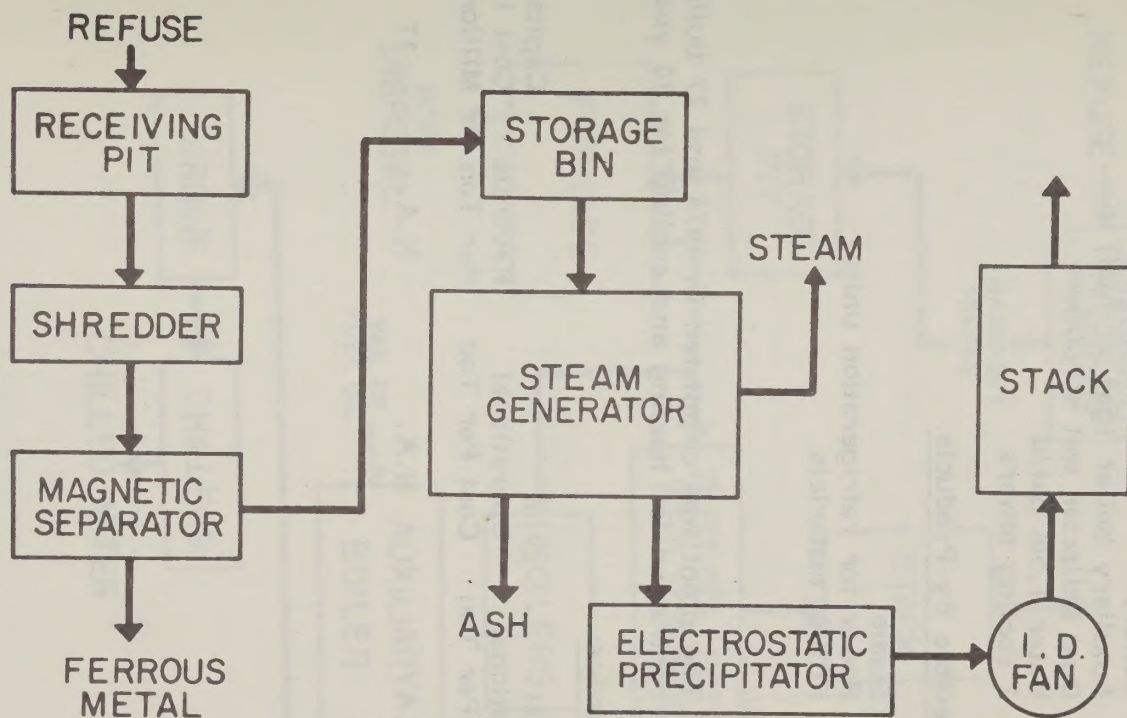
B. Marketable By-Products:

1. Steam
2. Ferrous metals

C. Status: System has been in operation since 1972 50% of steam is used to operate plant the other 50% has not been marketed as of yet.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$4.00	\$4.00	None	83	600



SYSTEM 4
HAMILTON INCINERATOR, HAMILTON ONTARIO

System 5: Nashville Central Heating & Cooling Project

A. Type of System: Multi level incineration with agitating

1. Transfer station
2. Truck to storage pit
3. Incinerator
4. Boilers
5. Auxiliary boiler (gas or fuel)
6. Dust collector wet scrubber
7. Water 1.5m gal/d
8. 2 cooling towers

B. Marketable By-Products:

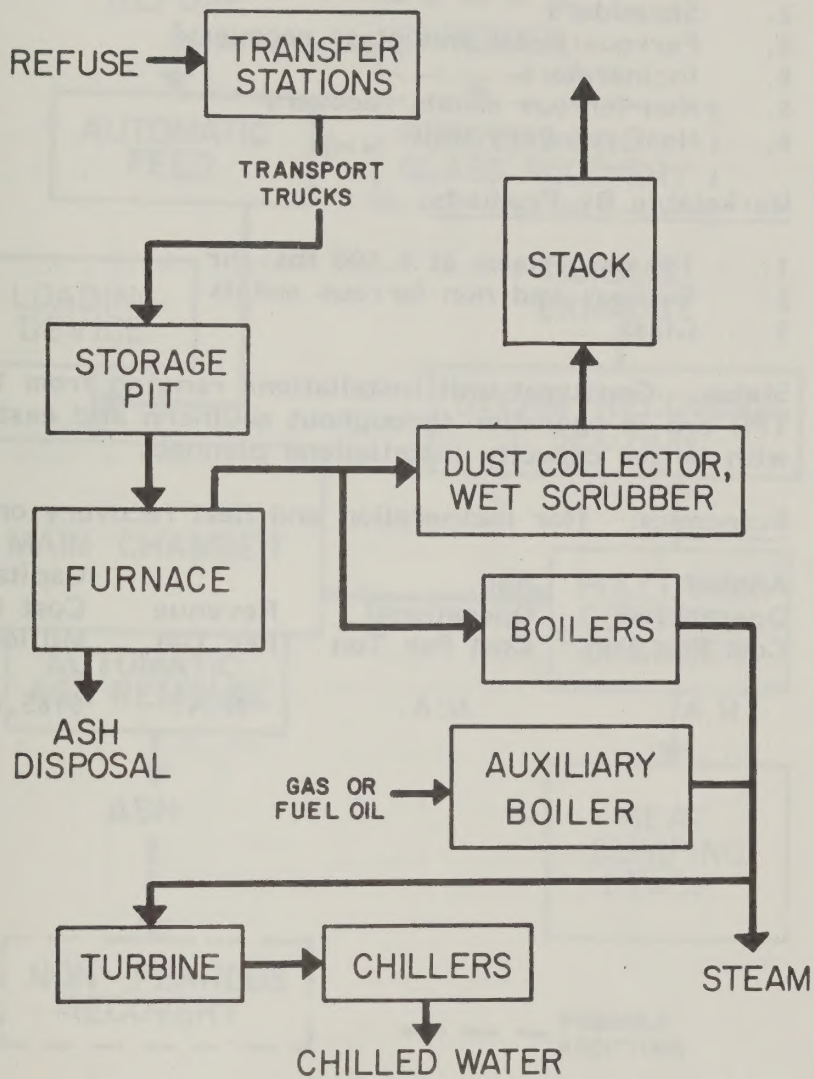
1. Steam
2. Power for refrigeration units
3. Filling materials

C. Status:

1. The plant was completed in 1974 and 27 buildings are contracted for heating and cooling for 30 years.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
N.A.	N.A.	N.A.	17	720



SYSTEM 5
NASHVILLE CENTRAL HEATING AND COOLING

System 6: Consumat^R
 U.S. Recycle Corp.

A. Type of System: Incineration with materials recovery

1. Loading device
2. Shredders
3. Ferrous metal and glass recovery
4. Incinerators
5. Non-ferrous metals recovery
6. Heat recovery unit

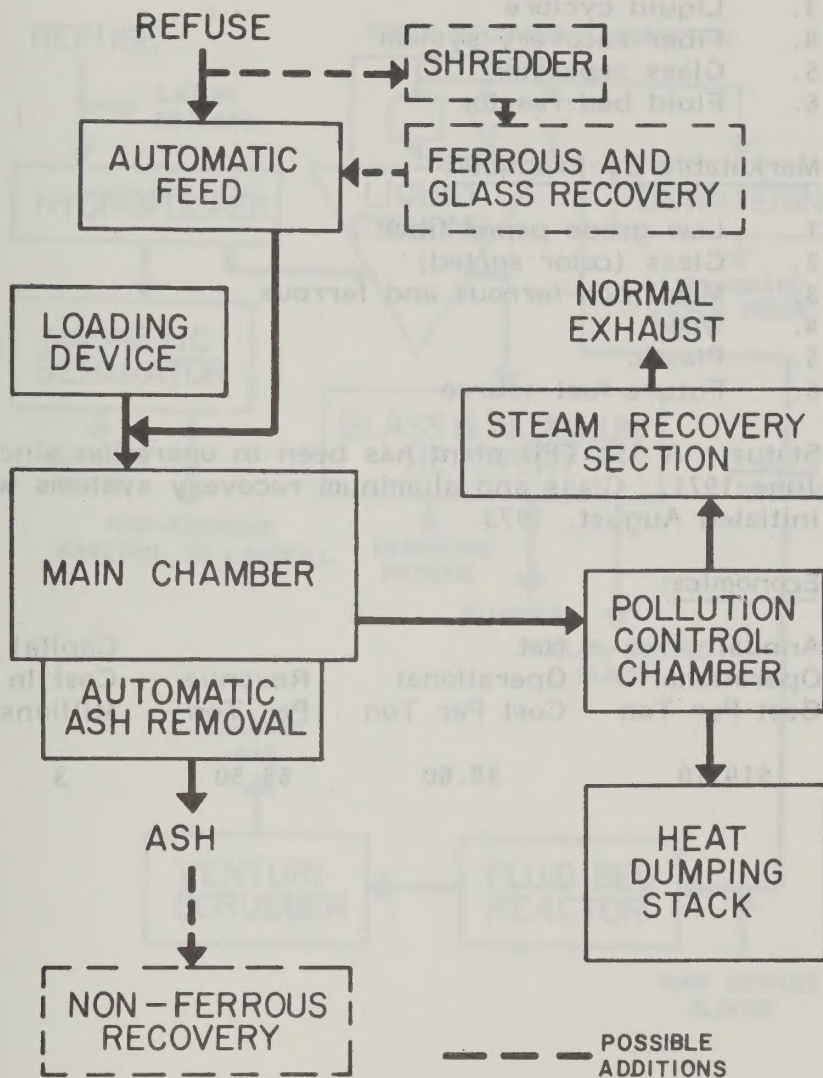
B. Marketable By-Products:

1. 150 psig steam at 6,500 lbs./hr.
2. Ferrous and non-ferrous metals
3. Glass

C. Status: Consumat unit installations ranging from 12-15
 TPD are in operation throughout southern and eastern U.S.
 with larger capacity installations planned.

D. Economics: (for incineration and heat recovery only)

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
N.A.	N.A.	N.A.	\$185,000	20 TPD



SYSTEM 6
 CONSUMAT^R

System 7: Hydropulping (Black and Clawson)

A. Type of System: Multi Recovery System

1. Hydropulper
2. Magnetic Separator
3. Liquid cyclone
4. Fiber recovery system
5. Glass separator
6. Fluid bed reactor

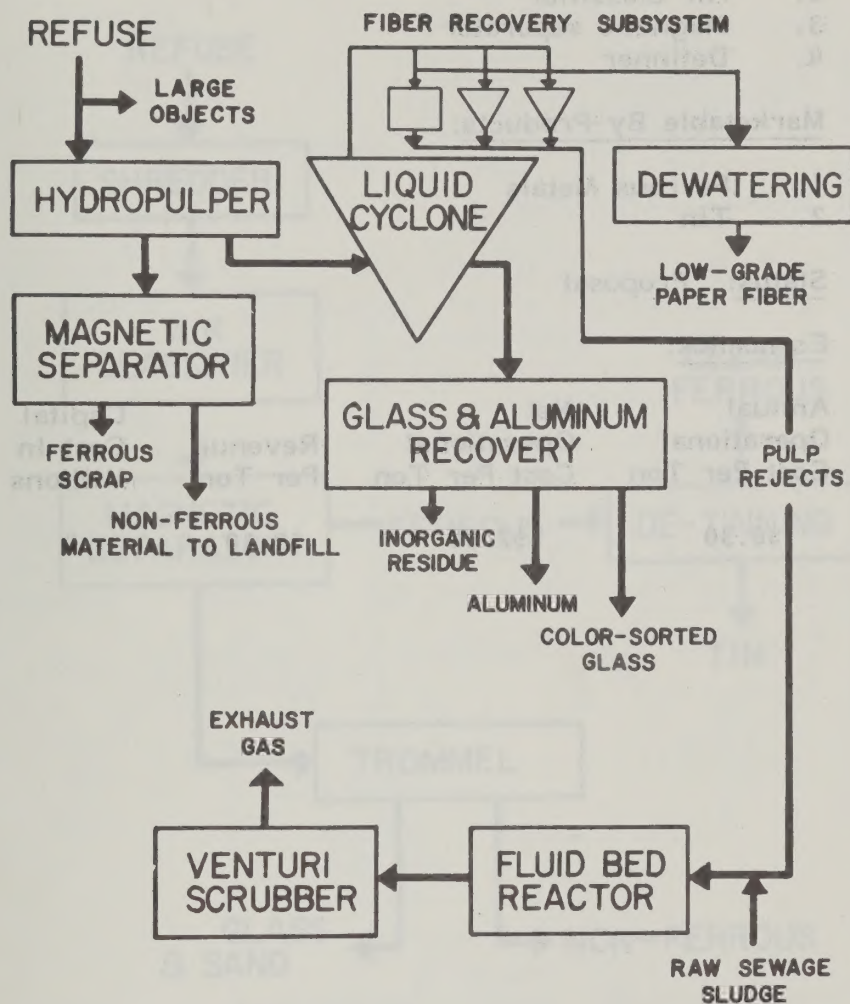
B. Marketable By-Products:

1. Low grade paper fiber
2. Glass (color sorted)
3. Metal non-ferrous and ferrous
4. Wood
5. Plastic
6. Future fuel source

C. Status: A 150 TPD plant has been in operation since June 1971. Glass and aluminum recovery systems were initiated August, 1973.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$14.10	\$8.60	\$5.50	3	150



SYSTEM 7
BLACK-CLAWSON HYDROPULPING FACILITY
FRANKLIN, OHIO

System 8: Front End Recovery System -- California Solid Waste Management Board

A. Type of Process: Material recovery system

1. Primary shredder
2. Air classifier
3. Magnetic separator
4. Detinner

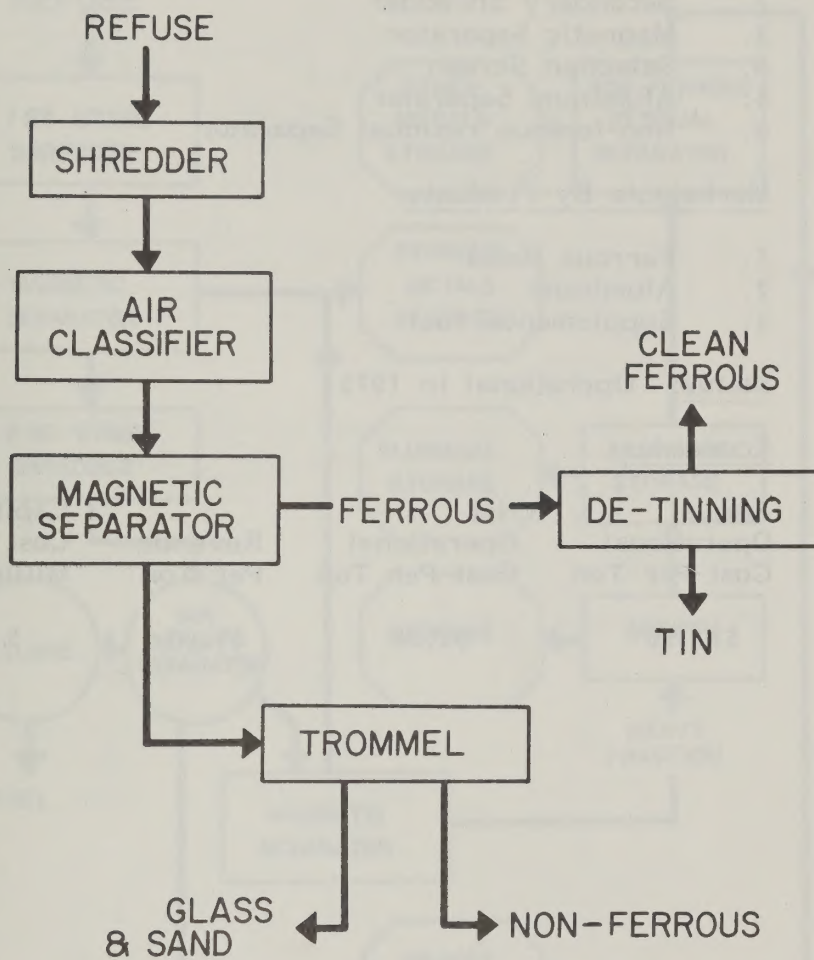
B. Marketable By-Products:

1. Ferrous Metals
2. Tin

C. Status: Proposal

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$6.30	\$2.80	\$9.10	8	1,500



SYSTEM 8

FRONT END RECOVERY SYSTEM
CALIFORNIA S.W.M. BOARD

System 9: Ames, Iowa Solid Waste Resource Recovery System

A. Type of Process: Materials and supplemental fuel Recovery System

1. Primary Shredder
2. Secondary Shredder
3. Magnetic Separator
4. Selection Screen
5. Aluminum Separator
6. Non-ferrous residual Separator

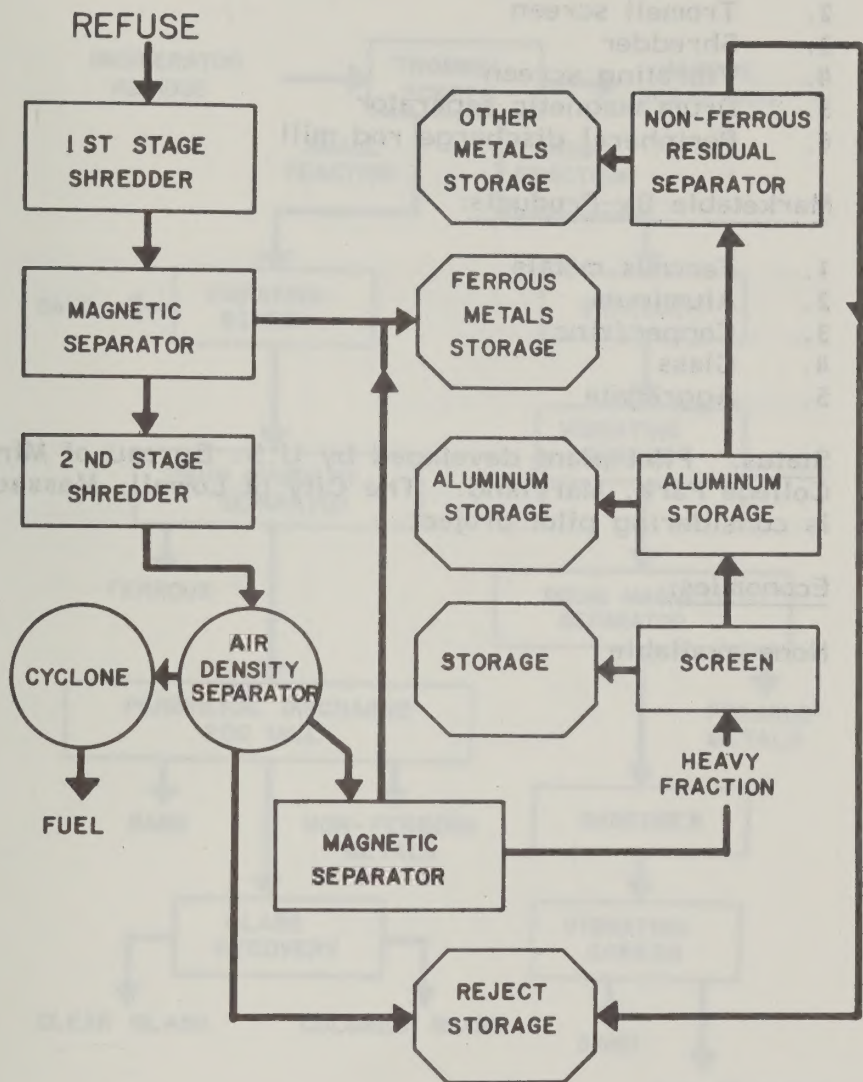
B. Marketable By-Products:

1. Ferrous Metal
2. Aluminum
3. Supplemental fuel

C. Status: Operational in 1975

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$11.90	\$2.90	\$9.00	5	400



SYSTEM 9
AMES, IOWA
SOLID WASTE PROCESSING PLANT

System 10: Incinerator Residue Separation
Lowell, Massachusetts

A. Type of System: Materials recovery after incineration

1. Incinerator
2. Tromell screen
3. Shredder
4. Vibrating screen
5. Drum magnetic separator
6. Peripheral discharge rod mill

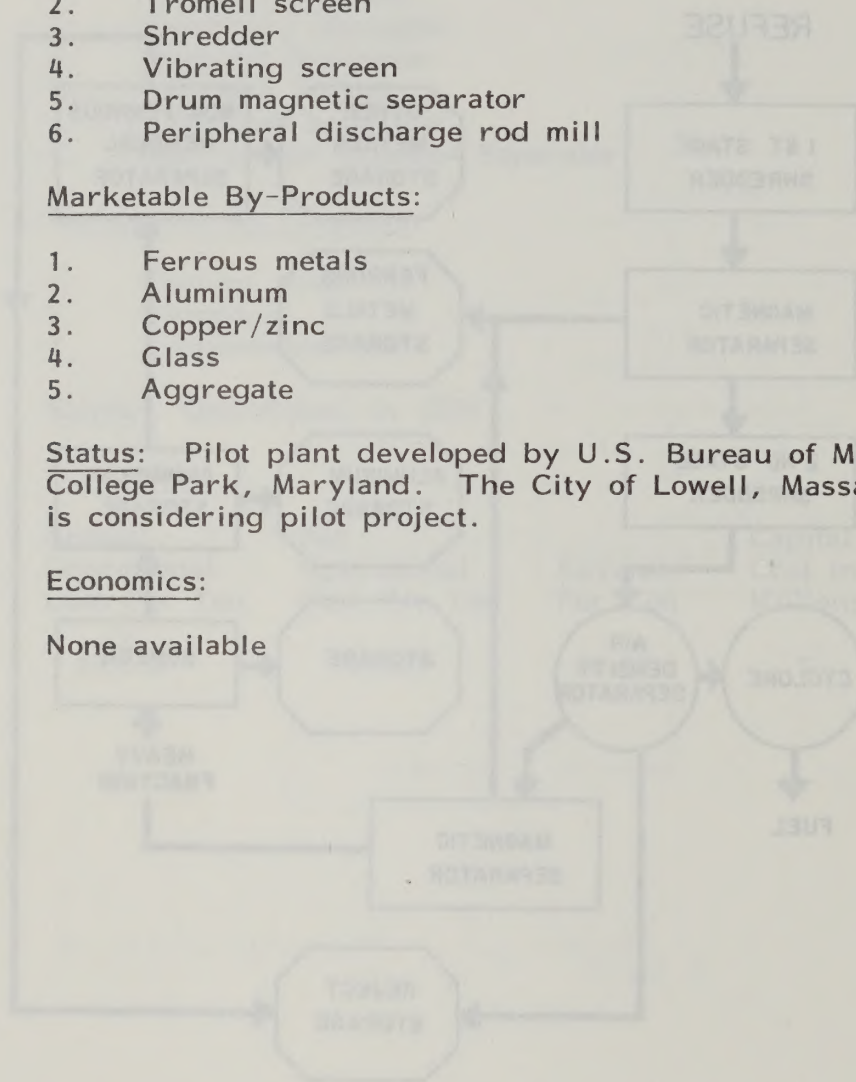
B. Marketable By-Products:

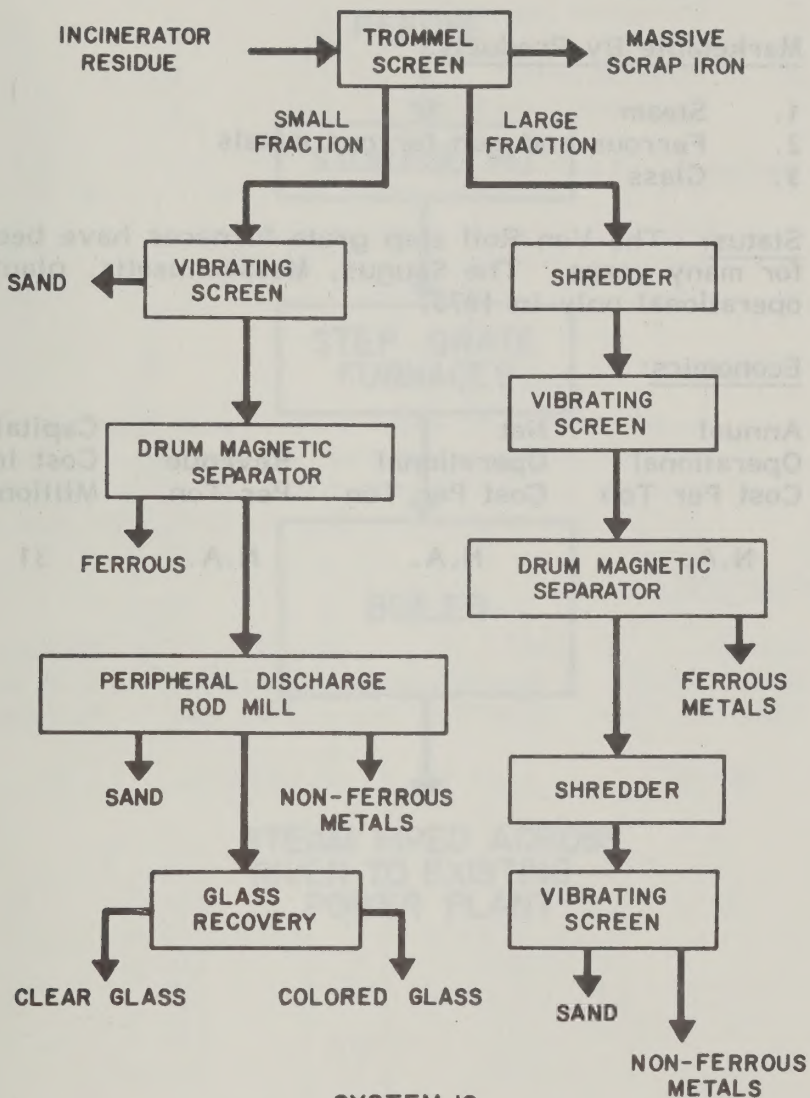
1. Ferrous metals
2. Aluminum
3. Copper/zinc
4. Glass
5. Aggregate

C. Status: Pilot plant developed by U.S. Bureau of Mines at College Park, Maryland. The City of Lowell, Massachusetts is considering pilot project.

D. Economics:

None available





SYSTEM 10
LOWELL, MASS.
INCINERATOR RESIDUE RECOVERY

System 11: Refuse Energy System Co.

A. Type of System: Incineration to produce steam

1. Storage pit
2. Von Roll step grate furnace
3. Boiler

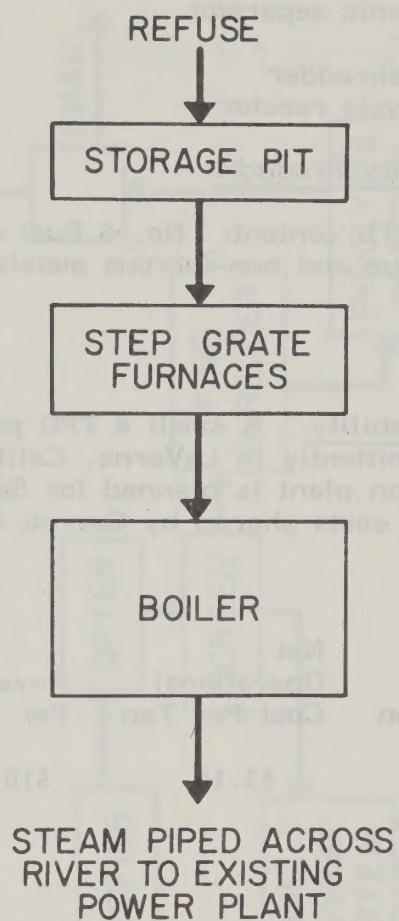
B. Marketable By-Products:

1. Steam
2. Ferrous and non-ferrous metals
3. Glass

C. Status: The Von Roll step grate furnaces have been employed for many years. The Saugus, Massachusetts, plant will be operational only in 1975.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Ton Per Day
N.A.	N.A.	N.A.	31	1,500



SYSTEM II
REFUSE ENERGY SYSTEM CO.

System 12: Garrett R&D Pyrolysis
La Verne, CA

A. Type of System: Flash pyrolysis at 900⁰ F

1. Primary shredder
2. Air classifier
3. Inorganic separator
4. Dryer
5. Fine shredder
6. Pyrolysis reactor

B. Marketable By-Products:

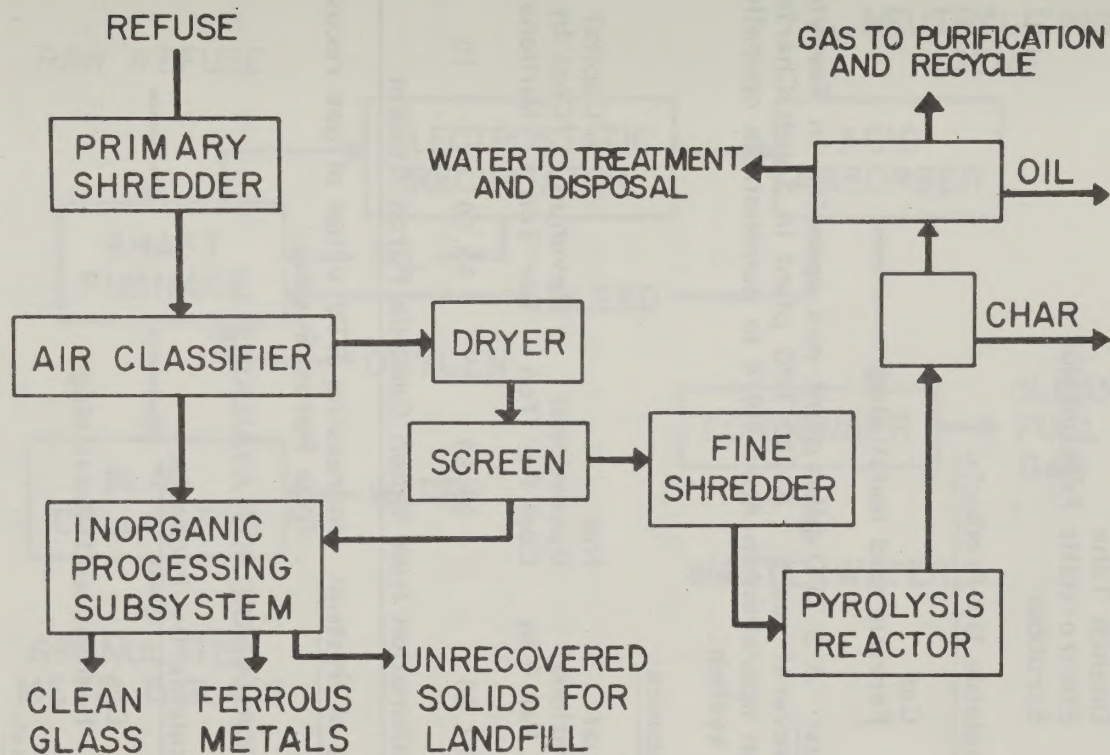
1. 75% BTU content: No. 6 Fuel oil
2. Ferrous and non-ferrous metals
3. Glass

C. Status:

1. **Availability:** A small 4 TPD plant has been operating intermittently in LaVerne, California. A 200 TPD demonstration plant is planned for San Diego, California, (with costs shared by Garrett EPA, and San Diego).

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$13.30	\$3.10	\$10.20	19	1,000



SYSTEM 12
GARRETT R&D PYROLYSIS

System 13A: Union Carbide Purox System

A. Type of System: Pyrolysis Gasifier
Oxygen Shaft Furnace

1. Storage Bins
2. Shaft Furnace
3. Quench Tank
4. Electro-static Precipitator
5. Scrubber

B. Marketable By-Products:

1. Gas
2. Ferrous and metal slag

C. Status: A 5 TPD pilot plant was operated in Tarrytown, NY, for several years. A 200 TPD plant in South Charlestown, WV, began operation in April 1974 to demonstrate operation of this system.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$7.80	\$3.80	\$4.00	10	1,000

System 13B: Methanation from Union Carbide Purox System

A. Type of System: Increasing BTU value of gas recovered from Purox System.

OTHER INFORMATION NOT AVAILABLE

B. Marketable By-Products:

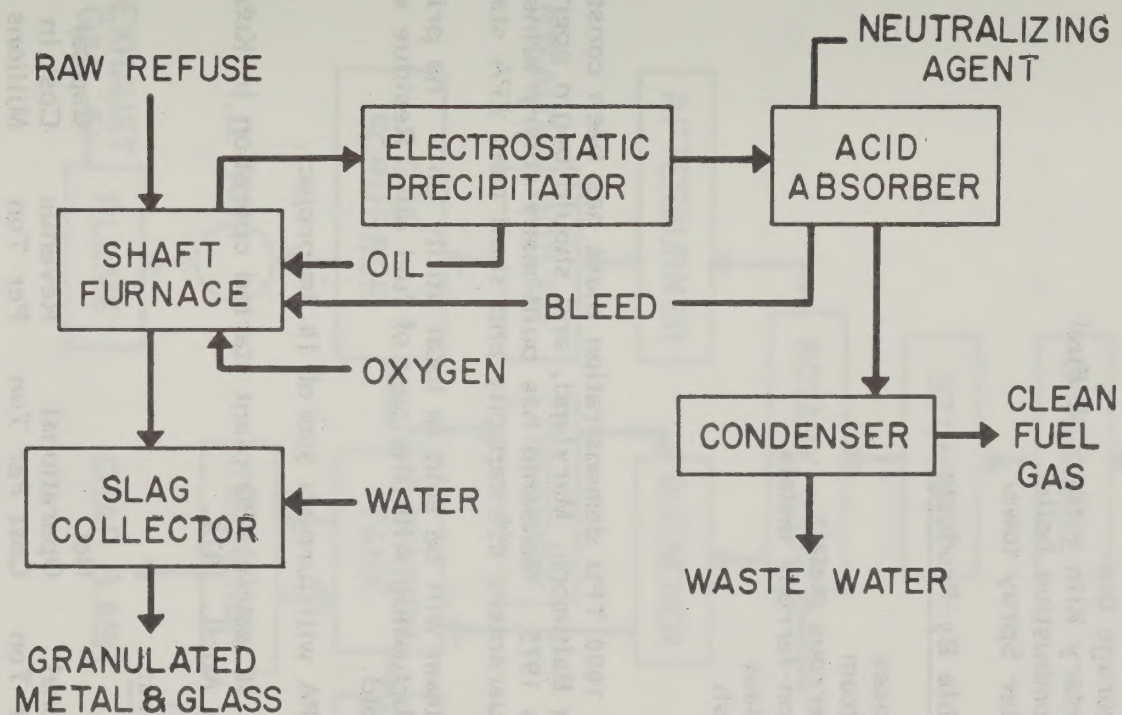
1. Gas
2. Ferrous and Metal slag

C. Status:

N.A.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$14.90	\$6.70	\$8.20	25	1,000



SYSTEM 13

UNION CARBIDE PUROX SYSTEM
OXYGEN REFUSE GASIFIER

System 14: Monsanto Landguard Systems
Monsanto Enviro-chem System
Baltimore, MD

A. Type of System: Pyrolysis (Rotary Kiln)

1. Shredders
2. Storage bin
3. Rotary Kiln + No.: 2 Fuel
4. Combustion boiler
5. Tier Spray tower

B. Marketable By-Products:

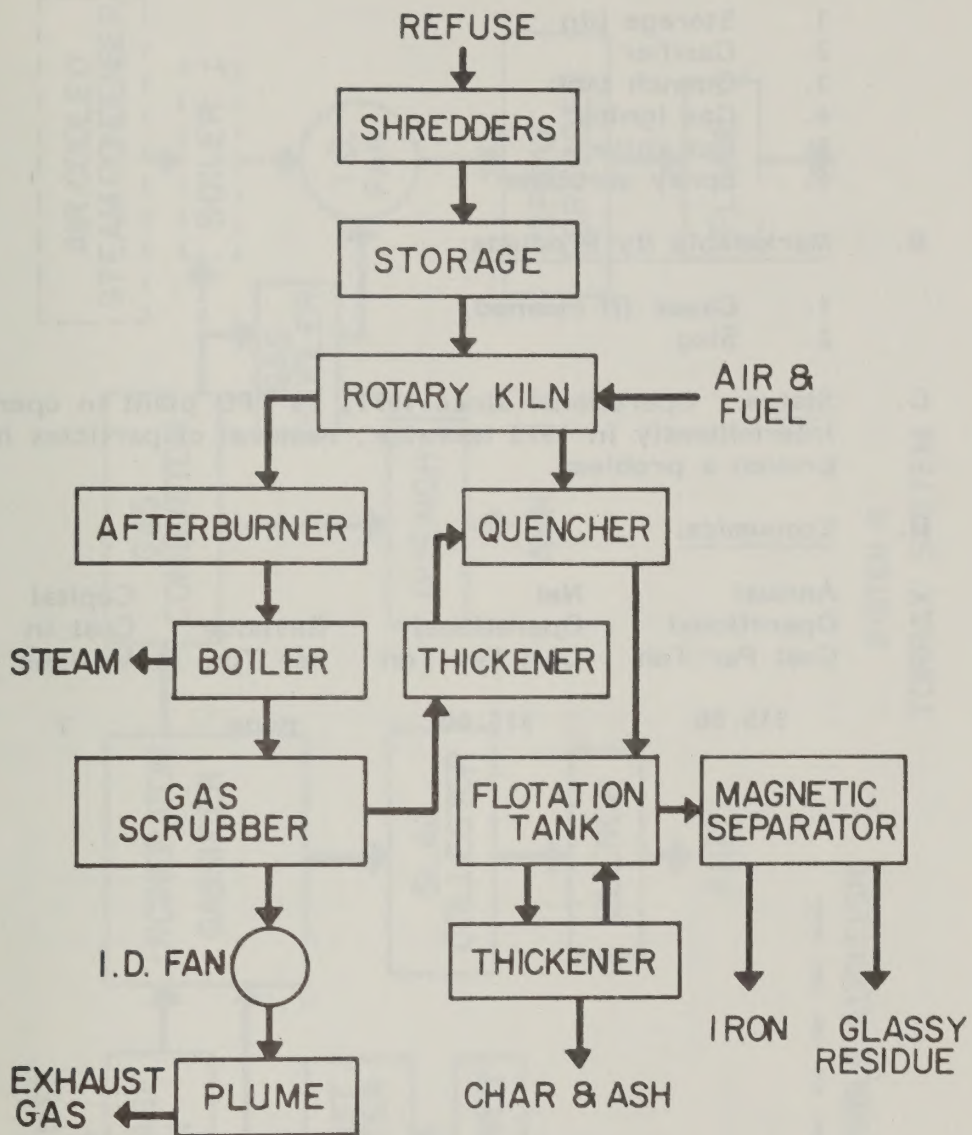
1. Gases
2. Steam
3. Ferrous metals
4. Non-ferrous metals
5. Glass
6. Ash

C. Status:

1. A 1000 TPD demonstration plant has been constructed in Baltimore, Maryland, and should begin operating in 1975. Monsanto has built many rotary kilns and guarantees 85% capacity and shall meet EPA standards.
2. Steam will be sold to local utility Co. The price fluctuating with the cost of fuel oil. Residue will be sold.
3. EPA will furnish \$6m of 14.8m project.
4. A 30 metric TPD plant started operation in Kobe, Japan, in April, 1974.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$13.80	\$2.60	\$11.20	15	1,000



SYSTEM 14
MONSANTO LANDGARD SYSTEM

System 15: Torrax System

A. Type of System: High temperature combustion

1. Storage bin
2. Gasifier
3. Quench tank
4. Gas igniter
5. Gas coller
6. Spray scrubber

B. Marketable By-Products:

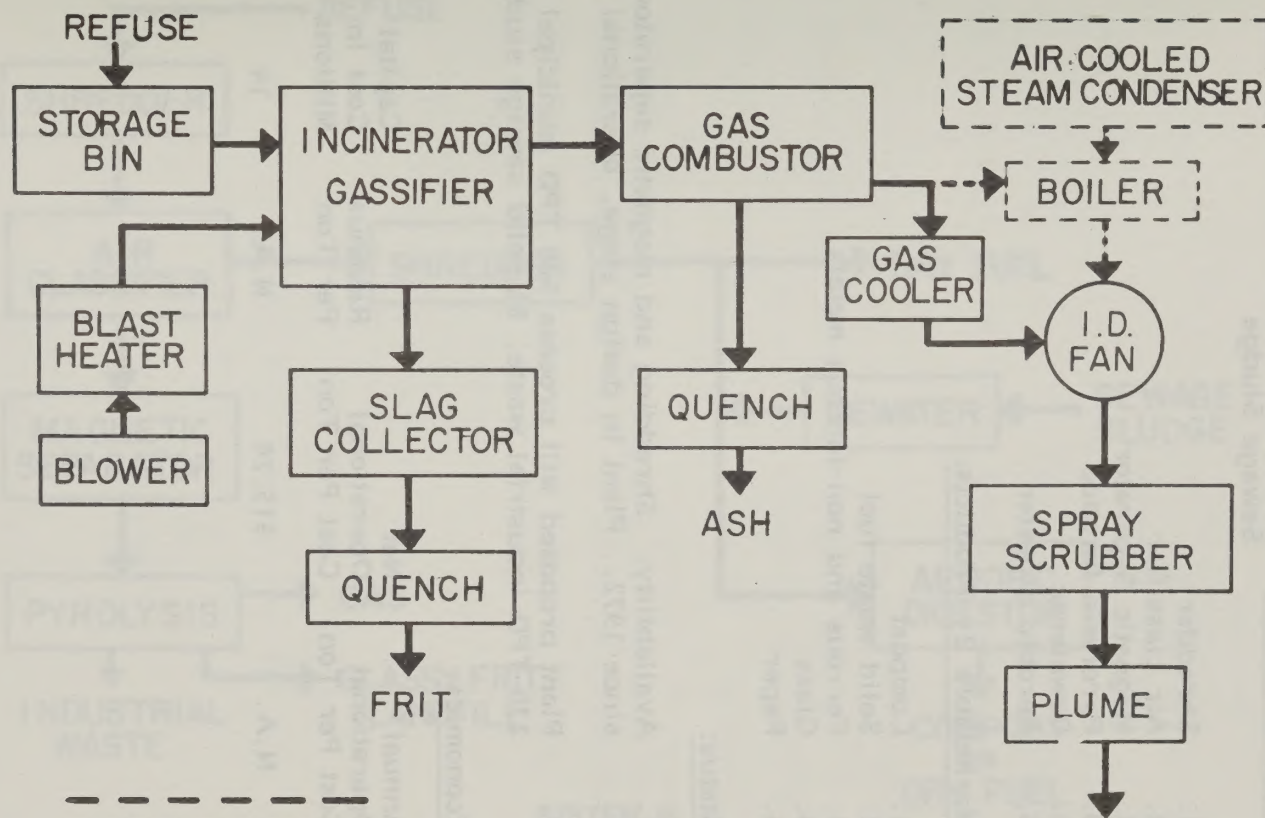
1. Gases (if cleaned)
2. Slag

C. Status: Operational since 1971, 75 TPD plant in operation intermittently in 1973 however, removal of particles has proven a problem.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
\$15.00	\$15.00	none	2	75



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POSSIBLE ADDITIONSYSTEM 15
TORRAX SYSTEM

System 16: All-American Environmental Control Corp.
Wilmington, Delaware

A. Type of System: Pyrolysis of Solid Waste and Sewage Sludge

1. Shredder
2. Air classifier
3. Magnetic Separator
4. Pyrolytic furnace
5. Dewaterer
6. Aerobic digester

B. Marketable By-Products:

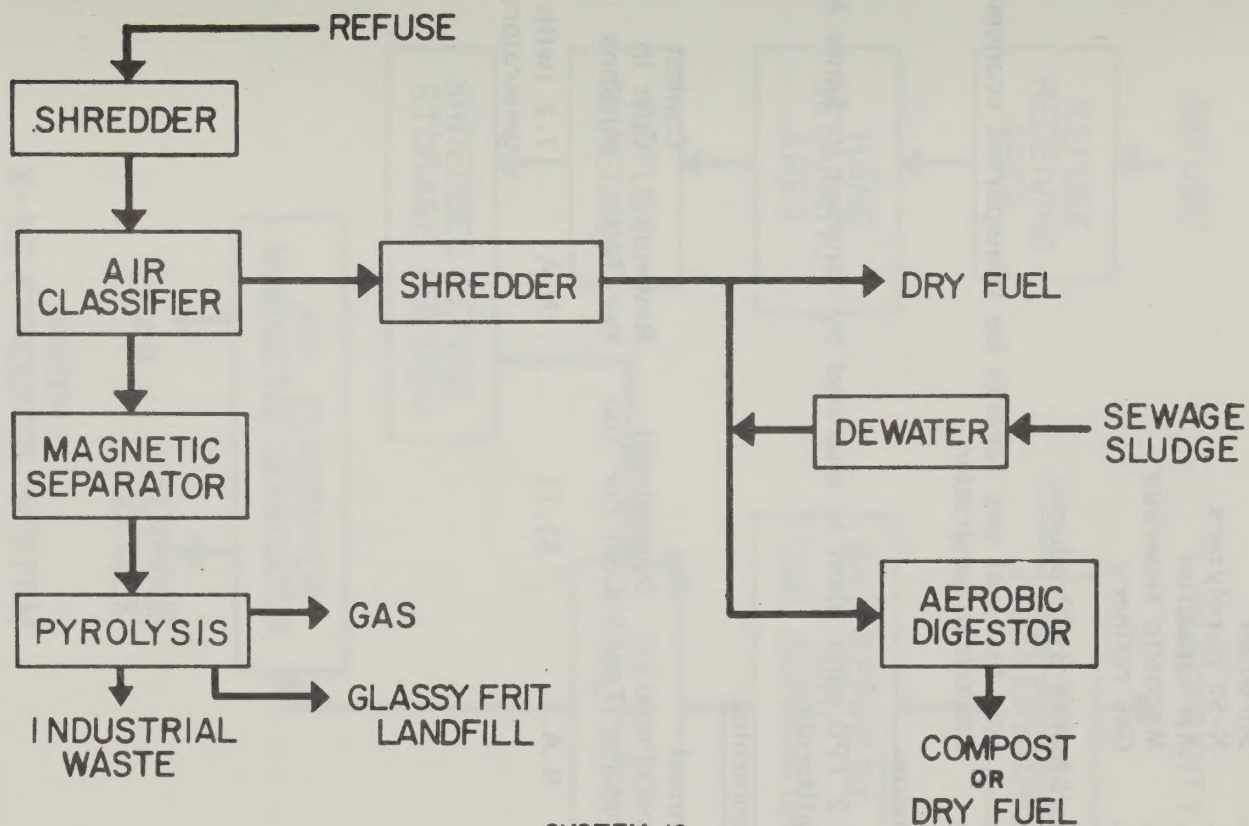
1. Compost
2. Solid waste fuel
3. Ferrous and non-ferrous metals
4. Glass
5. Paper

C. Status:

1. Availability: Shredding and magnetic separator in use since 1972. Plant in design stage, operational in 1977.
2. Plant proposed will process 500 TPD municipal waste, 230 TPD industrial waste, 8% solid sewage sludge.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
N.A.	\$15.20	N.A.	14	500



SYSTEM 16

PYROLYSIS OF SOLID WASTE AND SEWAGE SLUDGE
NEWCASTLE COUNTY SOLID WASTE CENTER

System 17: X-50 Pyrolysis System
Pyrolysis Systems, Inc.

A. Type of System: Pyrolysis

1. Shredder
2. X-50 pyrolyzers
3. Air classifier
4. Magnetic separator
5. Gas refinery

B. Marketable By-Products:

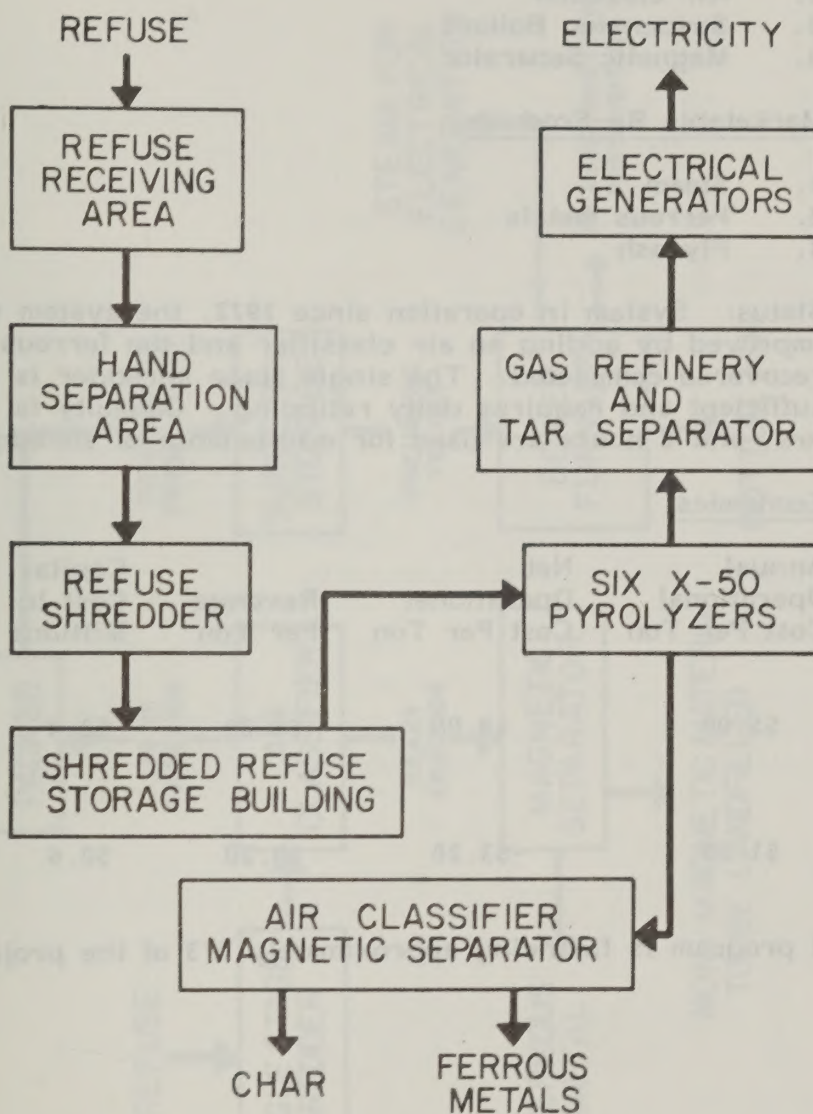
1. Low btu fuel gas (cannot be transported economically)
2. Electrical generation

C. Status:

A 2 TPD pilot plant is operated by contract in Santa Ana, California.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
N.A.	\$3.11	N.A.	7.2 (with generators)	500



SYSTEM 17
X-50 PYROLYSIS SYSTEM

System 18: Union Electricity St. Louis Boiler Project

A. Type of System: Thermal Process

1. Shredder
2. Air classifier
3. Suspension Boilers
4. Magnetic Separator

B. Marketable By-Products:

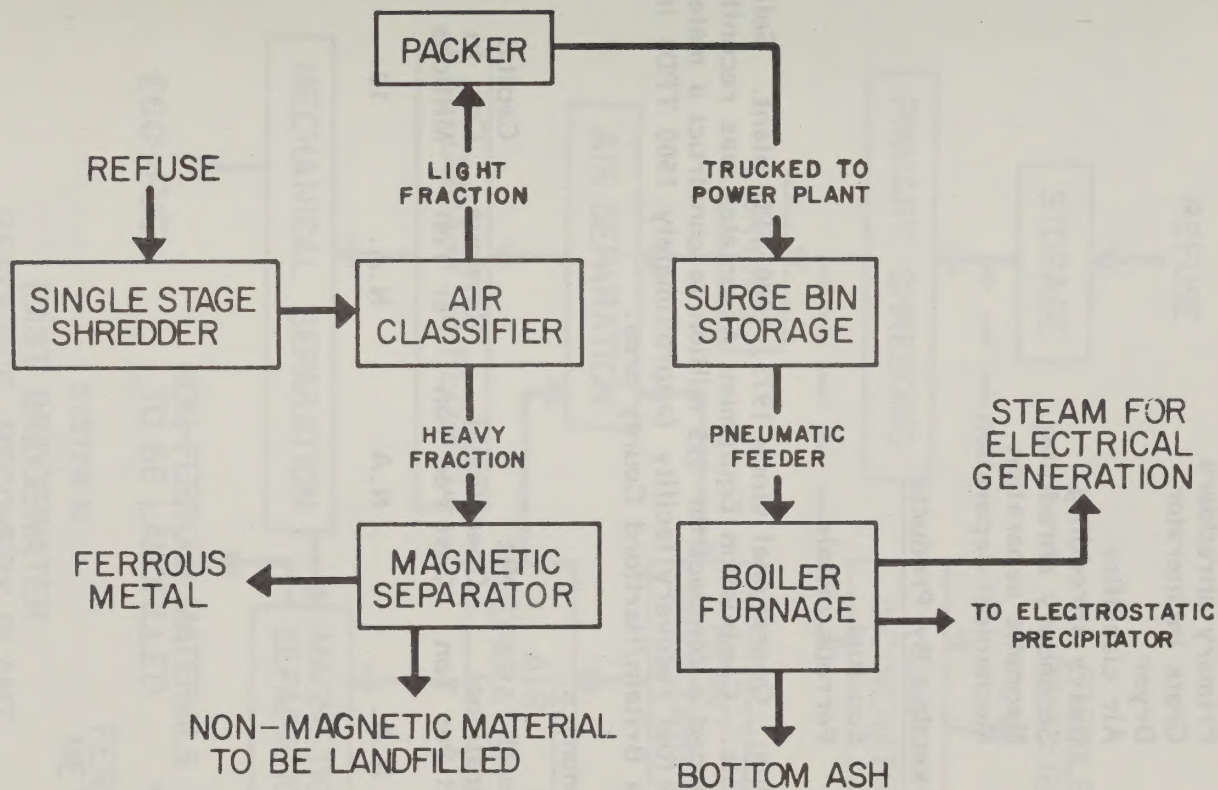
1. Steam
2. Ferrous metals
3. Fly ash

C. Status: System in operation since 1972, the system was improved by adding an air classifier and the ferrous metal recovered compacted. The single stage shredder is not sufficient and requires daily retipping. Capacity is 650/16 hrs. and 8 hours are used for maintenance of shredder.

D. Economics:

	Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
City of St. Louis	\$5.00	\$4.00	\$1.00	\$2.4	650
Union Electricity	\$1.00	-\$3.20	\$4.20	\$0.6	

An EPA grant program is financing approximately 2/3 of the project.



SYSTEM 18

UNION ELECTRIC BOILER PROJECT
CITY OF ST. LOUIS

**System 19: East Bridgewater Resource Recovery Plant
Combustion Equipment Associates**

A. Type of System:

1. Primary shredders
2. Grate incinerator
3. Dryer
4. Air classifier
5. Heavy shredding
6. Secondary shredding
7. Magnetic separation
8. Mechanical separation

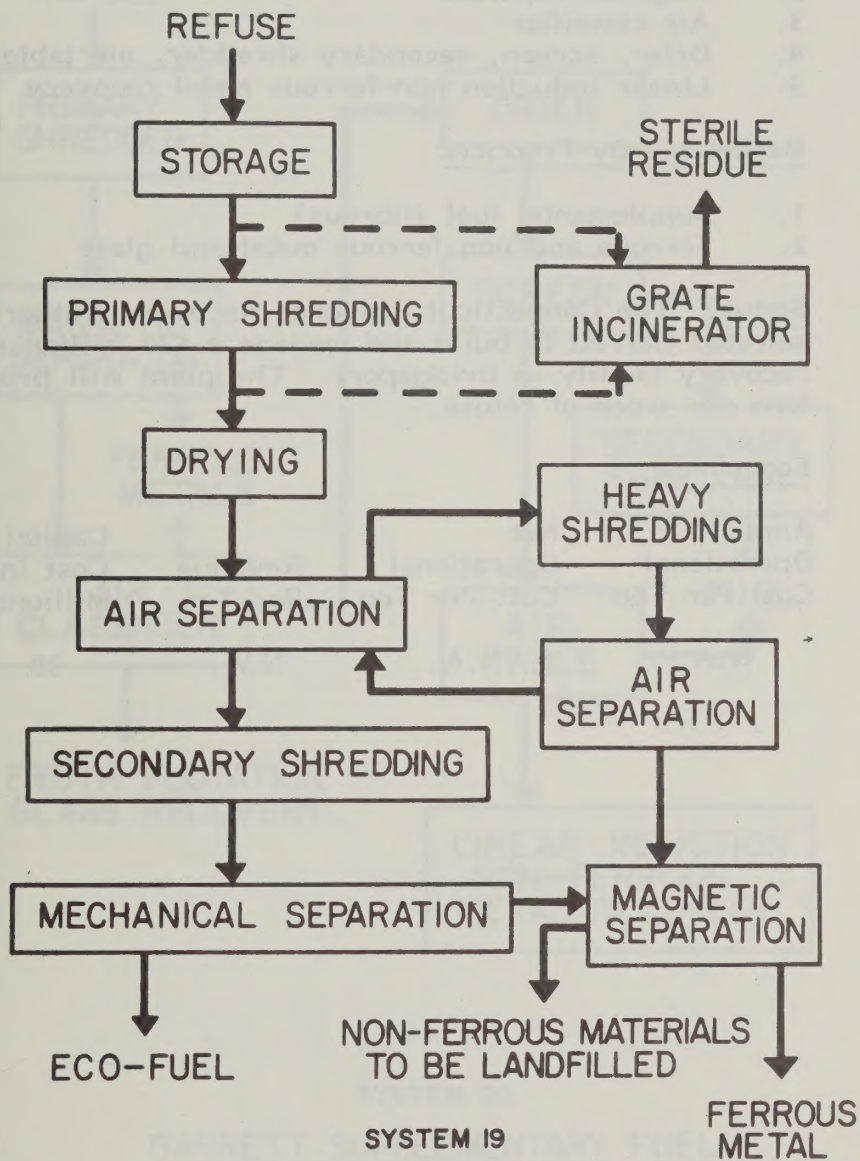
B. Marketable By-Products:

1. Eco-fuel
2. Ferrous metals

C. Status: Operational since 1973, 1200 TPD plant. Sells ferrous metals. Combustion Equipment Associates was recently awarded a contract for \$35 million to construct a materials and fuel recovery facility (approximately 1500 TPD) in the New Britain/Hartford County area.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
N.A.	N.A.	N.A.	10	1,200



SYSTEM 19
EAST BRIDGEWATER
RESOURCE RECOVERY PLANT

System 20: Garrett Supplementary Fuel and Resource Recovery

A. Type of System: Materials and fuel recovery

1. Primary shredder
2. Magnetic separator
3. Air classifier
4. Drier, screen, secondary shredder, air table
5. Linear induction non-ferrous metal recovery

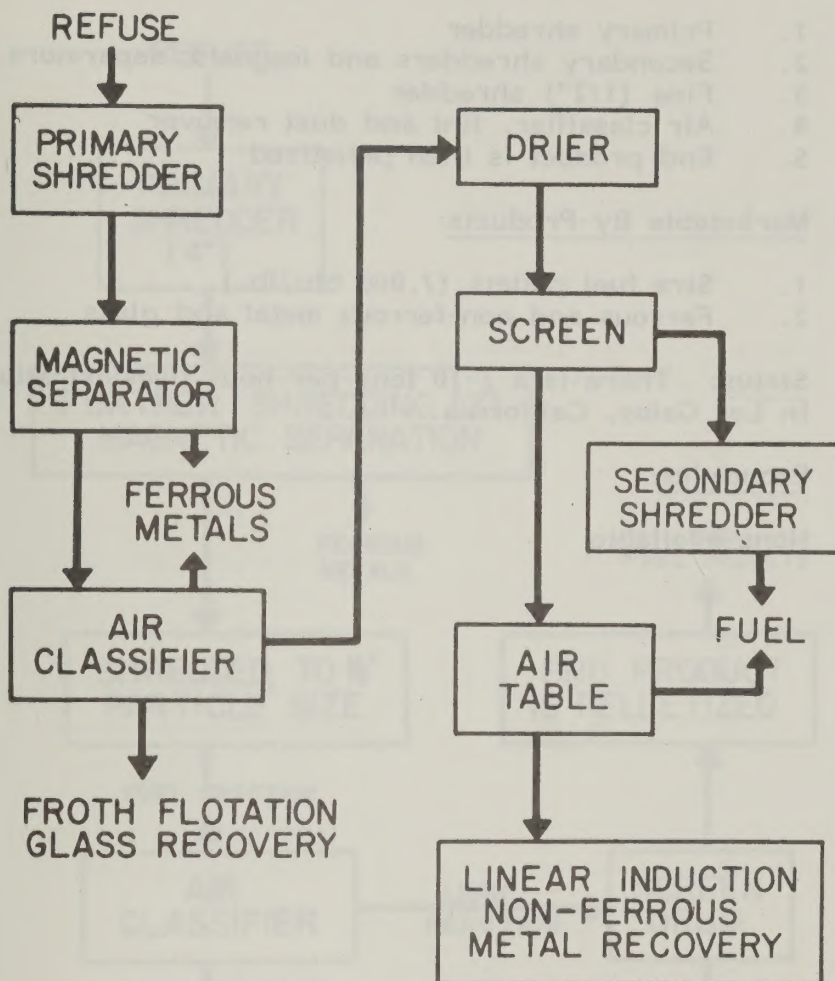
B. Marketable By-Products:

1. Supplemental fuel (fibrous)
2. Ferrous and non-ferrous metal and glass

C. Status: The Connecticut Resource Recovery Authority has selected Garrett to build and manage a \$30 million resource recovery facility in Bridgeport. The plant will process 7,800 tons per week of refuse.

D. Economics:

Annual Operational Cost Per Ton	Net Operational Cost Per Ton	Revenue Per Ton	Capital Cost In Millions	Capacity Tons Per Day
N.A.	N.A.	N.A.	30	7,800 tons per week



SYSTEM 20

GARRETT SUPPLEMENTARY FUEL
AND RESOURCE RECOVERY

System 21: Sira Fuel Pellets
Sira Corporation

A. Type of System: Fuel and material recovery

1. Primary shredder
2. Secondary shredders and magnetic separators
3. Fine (1/2") shredder
4. Air classifier, lint and dust remover
5. End product is then pelletized

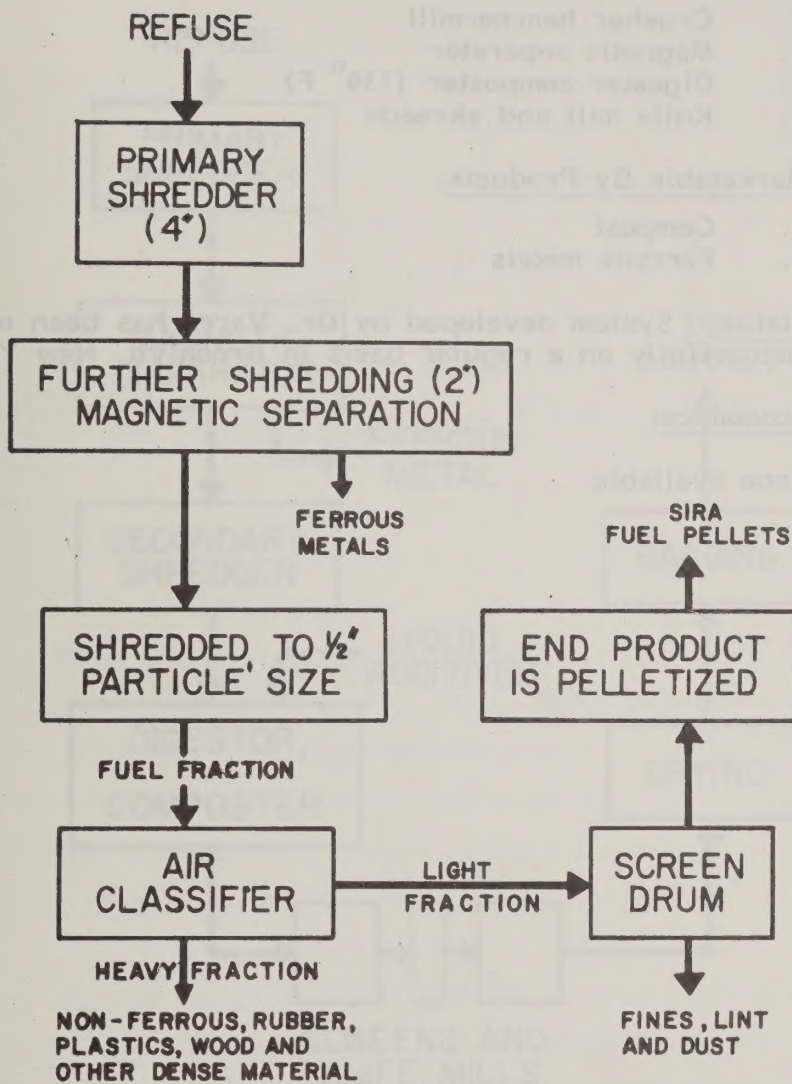
B. Marketable By-Products:

1. Sira fuel pellets (7,000 btu/lb.)
2. Ferrous and non-ferrous metal and glass

C. Status: There is a 7-10 tons-per-hour demonstration plant in Los Gatos, California.

D. Economics:

None available



SYSTEM 21
SIRA FUEL PELLETS

System 22: Varro Composting System

A. Type of System: Private commercial composting
(100 TPD)

1. Crusher hammermill
2. Magnetic separator
3. Digester compostor (130° F)
4. Knife mill and skreeds

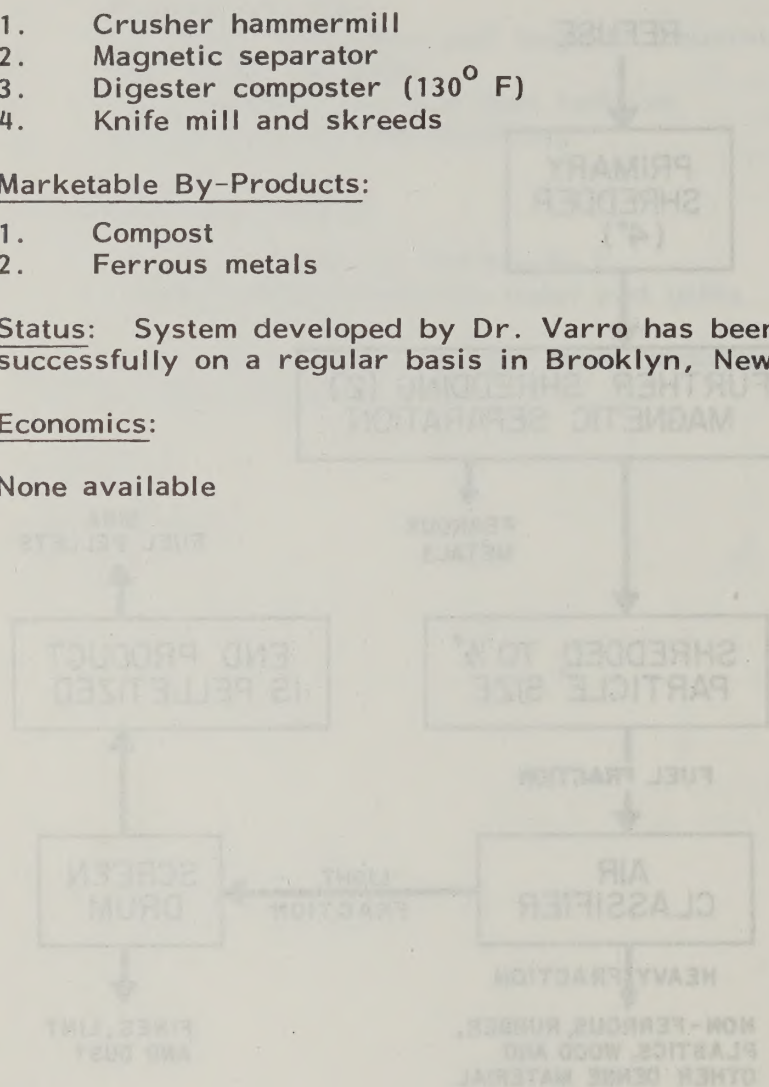
B. Marketable By-Products:

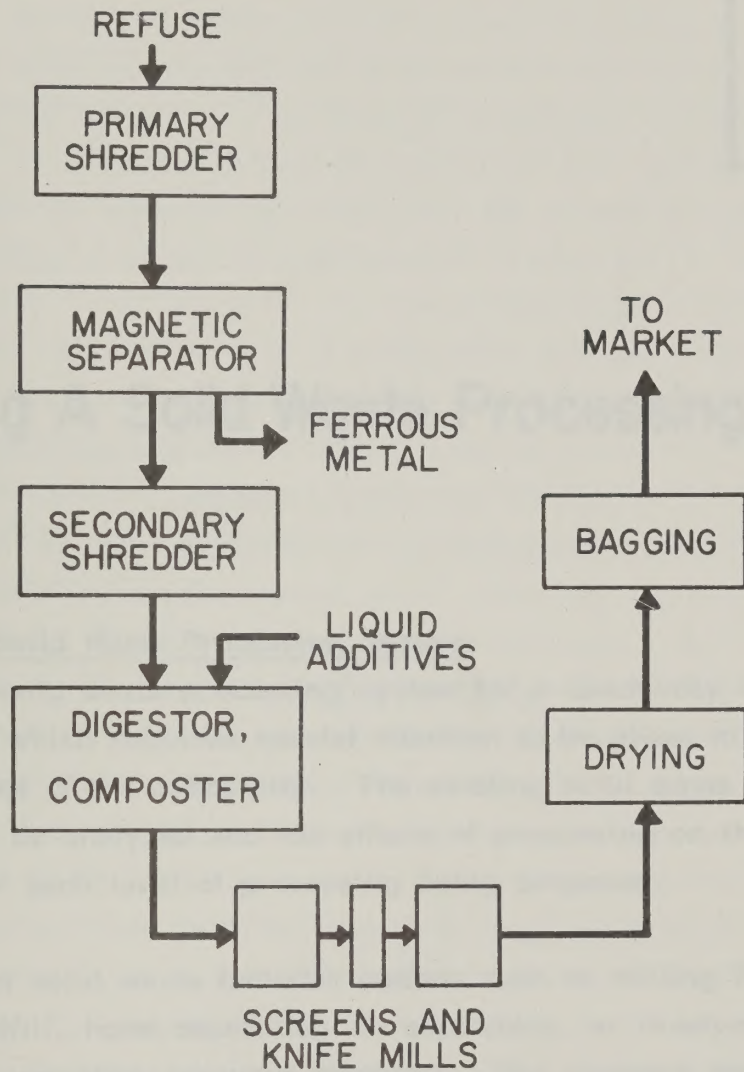
1. Compost
2. Ferrous metals

C. Status: System developed by Dr. Varro has been operating successfully on a regular basis in Brooklyn, New York.

D. Economics:

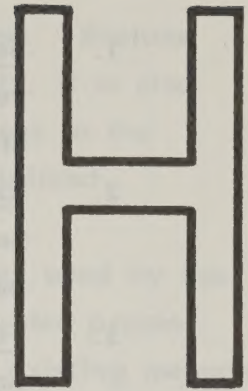
None available





SYSTEM 22
VARRO COMPOSTING SYSTEM

Appendix



Selecting A Solid Waste Processing System

Selecting a Solid Waste Processing System

Selecting a solid waste processing system for a community is a complex undertaking which requires special attention to be given to the unique characteristics of the community. The existing solid waste management system must be analyzed and the effects of processing on that system evaluated for each level of processing being proposed.

Processing of solid waste includes options such as milling for more efficient landfill, home separation of recyclables, or involved mechanical systems to accomplish resource recovery. The planners and decision makers evaluated these options to select the system which was most appropriate for Sacramento County. When evaluating the effects of processing on the existing management system, the staff identified certain traits affecting that system. These traits are described in the following eight sections:

1. Source and quantity of refuse - The type and quantity of refuse which is available for processing affects the type of system which ultimately will be selected.
2. Existing level of technology - This is evaluated by re-searching the processes that others have tried, that are now being experimented with, or that are currently underway.
3. Future technology assumptions - In regard to future technology, the following assumptions are made:
 - a. During the short term (up to 1980) no new "unheard-of-before" systems will emerge as a major system candidate; and
 - b. During the medium term (1980 to 1990) existing systems will be improved to such an extent that major systems will be technologically feasible and might be economically feasible.
4. Environmental factors - Environmental factors such as air quality standards, water quality standards, and noise effects must be determined and evaluated.
5. Location of facility or facilities - System selection is highly dependent upon the location of proposed facilities. Some output products such as steam, fuel and gas make the decision concerning the type of system highly dependent on site location.
6. Type and degree of recovery - Two very influential factors guiding selection of a processing system are the type (material, fuel, energy) and degree of recovery which the community finds to be acceptable, especially in regards to their economic impact.
7. Cost of facility - Although difficult to determine, the cost of a system is the most identifiable basis for decision making.
8. Marketability of processed materials - Many options are available in terms of output product. The sale of those

products affect the total economics of the system. Besides having an outlet which will take these materials, it is also important to receive minimum revenue guarantees in the form of contracts so that economics can be stabilized.

The approach described by the eight traits listed above was used by the Sacramento County Planning Staff to arrive at the recommended processing alternative. The effect of each of these traits on the existing management system is dynamic and therefore must be re-evaluated periodically for the purpose of implementing either change or increase in the level of processing when conditions exist for Sacramento County to consider implementing a rear-end system in conjunction with its existing processing (proposed in this plan), this evaluation approach will help describe the effects of implementing the proposed rear-end system. The evaluation approach which is presented above may also help other communities recommend different levels of processing depending on local needs and conditions.

There are five major locations in Sacramento County which could benefit in the future from an energy source of the type created with a rear-end system which produces steam, dry fuel, heat, gas or oil for sale to local users. These locations are:

- a. State Buildings - It is technically feasible to heat and cool state office buildings in downtown Sacramento from energy conversion of solid waste. A location near the buildings would be mandatory.
- b. Port Industrial Complex - A large industrial complex is planned at the deep water channel in east Yolo County. Some of the energy required for that facility could conceivably come in the form of either steam or electricity from solid waste.
- c. Sanitation District - The newly created sanitation district which is regionalizing waste water treatment has consoli-

dated all treatment plants in the area into one main plant near Freeport. Energy conversion of solid waste could supply some of the energy required to run the plant.

- d. Electricity - Solid waste can be incinerated to produce steam which can be used to generate electricity. Such a plant might be located adjacent to any electrical substation.
- e. Industry - Local industry could use energy produced by these processes on an individual basis. Procter and Gamble and numerous food processors are typical candidates. One of the major drawbacks is the intermittent supply of energy which would be available.

Conclusion

The system designer must evaluate all these items when selecting the processing system which is most appropriate for the local community. In regards to Sacramento County, a front-end system would: 1) facilitate materials recovery, which becomes more important as natural resources become more scarce; 2) be beneficial to the County landfill in terms of extended life, daily cover requirements, vectors, etc.; and 3) would simplify the addition of a rear-end system in the future. A rear-end system, such as incineration to produce steam, could be implemented now. However, this would preclude the implementation of future technologies.

Appendix



Markets For Resource Recovery

The major purpose of resource recovery is to remove as many materials from the solid waste stream before disposal as is economically feasible. The objective of a resource recovery program is to recover the materials and offset the recovery and handling costs by selling the materials for reuse. This requires that markets be available to receive these materials. Markets, when they exist, are often extremely unstable and are usually not capable of consuming large quantities of the recovered materials. Sometimes the locations of markets are far enough away to make it economically infeasible to recover materials due to the cost of transportation. Therefore some materials with potential for reuse continue to be landfilled or the cost of recovery is offset by other means. Table I-1 presents market conditions for many products of resource recovery based on conditions in Sacramento County in January, 1975.

TABLE I-1

MARKETS FOR RECOVERED MATERIALS

<u>Materials</u>	<u>Percent Municipal Waste</u>	<u>Market Specs.</u>	<u>Current Value</u>	<u>Distance to Market</u>	<u>Data Source</u>	<u>Comments</u>
Ferrous Metals	7.2%	Clean no labels	\$30. per ton	15 miles	Based on Industry Information	Market shows good growth prospects
Tin	0.04%	Refined to 99.95%	\$7000. per ton	100 miles	Kaiser Steel; American Can Co.	Tin is expected to be in short supply
Aluminum	1.5%	No bi-metal cans	\$300. per ton	Local	Based on industry information	High market value and a growing market
Other non-ferrous metals	0.06%	N.D.	N.D.	N/A	N.D.	No specific information available
Sorted Glass	6.9%	Clean containers. No metal rings	\$20 per ton	100 miles	Based on Industry Information	Glass industry is encouraging glass recovery
Newsprint	4.8%	No magazines No Adhesives	\$10 per ton	Local	Based on Industry Information	Long term market potential good
Corrugated	6.4%	No Adhesives	\$10 per ton			
Oil	N/A	Purity to Industry specs.	\$1.15 per Therm	Local	Based on PG & E studies	Oil from pyrolysis could be marketable
Gas	N/A	To Industry specs.	\$.08 per Therm	Local	Based on PG & E studies	Shortage of natural gas

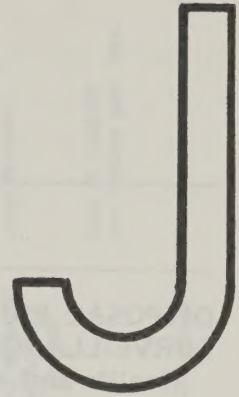
TABLE I-1 (Continued)

<u>Materials</u>	<u>Percent Municipal Waste</u>	<u>Market Specs.</u>	<u>Current Value</u>	<u>Distance to Market</u>	<u>Data Source</u>	<u>Comments</u>
Dry Fuel	N/A	Must be adaptable to boiler	\$.08 per Therm	More than 1000 miles	Based on PG & E Information	No markets in California
Steam	N/A	Must be physically close to market	\$.11 per Therm	Local	State Data	Price indexed to fuel source
Electricity	N/A	N/A	\$.005 per kilowatt/hour	Local	Based on PG & E Information	Readily marketable product
Other Paper Fiber	24.0%	No current market	N.D.	N.D.	Based on Industry Information	Short supply of virgin pulp should create a market
Tires & Rubber Products	2.7%	No current market	N/A	N/A	Based on Industry Information	Intensive research underway
Wood	4.5%	Clean-No Building Paper or shingles attached	\$2/ton	Local	Kelbro	
Plastic	1.7%	No market specs.	N.D.	N/A	Based on Industry Information	Only some types of plastics are recoverable
Textiles	1.4%	Separate by fiber types	N/A	N/A	Based on Industry Information	Mixture of different fibers makes recovery difficult

N.D. = No Data

N/A = Not Available

Appendix



Financing The Alternatives

FINANCING THE ALTERNATIVES

Table J-1 summarizes the financing needs of the plan for each functional area. Note that all elements require operating funds. Some elements have modest financing needs for planning and enforcement. The facilities plan requires the bulk of operating funds. The facilities plan will require capital to construct transfer stations, a processing station, and an energy recovery/conversion facility.

Revenue Sources. Table J-2 summarizes and evaluates revenue sources for solid waste management. These revenue sources can be used to meet operating expenses or to pay debt service on capital.

Gate fees and service charges are the most useful revenue sources for solid waste management. These two sources are desirable because they are easy to administer, fairly reliable and do not compete with other public projects. Not competing with other public projects is important;

TABLE J-1
FINANCING NEEDS BY FUNCTIONAL AREA

	Operating Needs	Capital Needs
DISPOSAL ENFORCEMENT / SURVEILLANCE		
Health and safety	Enforcement Higher operating costs at landfills	
Pollution abatement Litter control	Enforcement Litter control	
PLANNING & COORDINATION		
Public information	Program operations	
Master plan review & monitoring	Revision of plan in 1978	
Plan disposal for city	Planning	
COLLECTION & STORAGE		
Service standards	Enforcement	
Health & safety	Enforcement	
SPECIAL WASTE MANAGEMENT		
Group 1 waste	Monitoring	
Group 3 waste	Regulation	
FACILITIES PLAN		
Transfer station	Operation	Construction
Processing stations	Operation	Construction
Energy recovery/conversion	Operation	Construction

TABLE J-2

REVENUE SOURCES FOR SOLID WASTE MANAGEMENT

	Competes with other public projects	Ease of Administration	Reliability	Applicability to conventional landfill or transfer stations	Applicability to resource recovery	Miscellaneous
Property tax/ General fund	Yes, because of tax rate limitations (RT 2201 ff).	Easiest of all sources.	Excellent	General fund support of conventional facilities unnecessary because of low risk.	Because resource recovery is risky, general fund support may be desirable.	Vacant land also pays.
Service charges	No	Can be converted to liens with action by city or County.	Good	Very good with mandatory collection.	Very good with mandatory collection.	Service charges currently finances most collection.
Gate fees & Disposal surcharges	No	Requires a gate keeper.	Good	Very good. If facilities are large enough to justify a gate keeper. May encourage littering.	Must be paired with control of waste.	
Franchise fee	No	Requires audit of private enterprise.	Good	Where use of facilities can be assigned exclusively to private industry.	Only where use is exclusively by private industry.	Franchise fees or collectors can be used as in lieu of payments to pay for disposal.
Land use fees	No	After initial categorization, collection is easy.	Moderate until more experience is acquired.	Very good where used to pay for either a) only disposal or b) a mandatory collection system.	Very good when used to pay for either a) only resource recovery and disposal or b) a mandatory collection system.	Requires establishing a billing system based on land use classification.
Sale of materials	No	Moderate	Poor	(NA)	Yes	Sale of material can reduce gate fees.

recently enacted tax rate limitations (RT 2201 ff) allows local governments to increase their tax rate only for population and cost of living increases. This limitation creates incentives to place many activities on an enterprise basis. To protect scarce tax rate capacity, all financing recommendations will rely primarily on charges, (gate fees, service charges, and land use fees).

One recent innovation in revenue sources for solid waste management is the land use fee. A land use fee system is authorized under Sections 25210.77e and 25830 of the Government Code. These sections authorize a County or County service area to levy

"Fees to be used for the acquisition, operation and maintenance of County waste disposal sites and for financing waste collection, processing, reclamation and disposal services where such services are provided. In establishing the schedule of fees the board of supervisors shall classify land within the unincorporated area based upon the various uses to which the land is put, the volume of waste occurring from different land uses and other factors..."

Thus, land use fees can be used to support capital or operating costs in unincorporated, presumably rural, areas. The law goes on to state that these land use fees may be converted to tax liens if unpaid. This conversion can result in sale of land for payment of fees. Such a provision considerably enhances the security of these revenues. It can substantially increase the marketability of revenue bond issues used to finance capital facilities.

Capital Formation. Table J-3 summarizes and evaluates capital sources available for financing solid waste management. Five of these alternatives are particularly attractive for financing the facilities plan. These are:

- o *1941 Act Revenue Bonds - These bonds are slightly less complicated to issue than lease-revenue bonds. They require a $\frac{1}{2}$ majority vote. They are supported from revenues of a solid waste enterprise.*

TABLE J-3
CAPITAL SOURCES FOR SOLID WASTE MANAGEMENT

	Competes with other public projects	Support	Marketability	Interest Cost	Vote	Miscellaneous
General Obligation Bonds	Yes, because of debt limitations.	Taxes	Very good	Lowest of all local public debt (6-7%)	2/3 Majority	Can be supported with enterprise revenue with taxes as ultimate support.
Revenue Bonds	No	Enterprise revenues-Reserve fund.	Requires history of revenues. Requires debt coverage.	Moderate (7-8%)	1/2 Majority	Enterprise revenues come from service charges, gate fees, lease payments, land use fees.
Revenue Sharing	Yes	(NA)	(NA)	None	None	
Lease-Revenue Bonds (NPC)	Somewhat, broad debt limitation.	Pledge of lease payments from general fund. Reserve fund.	Requires demonstration of availability of funds for least payments.	High (7.5-8%)	None	Lease payments can be supported with enterprise revenues.
Leasing	No	Lease payments.	Not for long term.	High (8-10%)	None	
Private Financing	No	Sufficient security of enterprise revenues.	Requires assurance of revenues.	High, but mitigated by tax advantages.	None	CPCFA* may; allow private financing using state revenue bonds.
Reserves	Yes	Accumulated reserves.	(NA)	None	None	Requires long term capital accumulation program.

*California Pollution Control Financing Authority

- o *Leasing - Leasing by public enterprise is an excellent method of financing low cost capital expenditures. The lease is normally held by a leasing company or a bank.*
- o *Private financing - Private industry could provide facilities for lease to public enterprise or provide facilities for its own operation under contract to a public authority. Private financing requires no vote.*
- o *Reserves - Accumulated reserves could be used for small capital expenditures (e.g. rolling stock). Their use requires careful long-term planning.*
- o *Lease revenue bonds (non-profit corporation) - These are non-voted bonds issued by a tax exempt public corporation. The bonds are supported with lease payments by a government agency. A non-profit corporation can issue tax exempt bonds on behalf of any public entity, though special IRS approval is required to secure the tax exempt status of the bonds.*

The ease of capital financing depends primarily on the security of supporting revenues. The most secure revenues for public financing are property taxes. Property tax support of public bond issues is, however, quite difficult to obtain. General obligation bonds require a 2/3 approving vote. Property taxes can be used to support lease-revenue (NPC) bonds or private contract payments, but such use often competes with other general-fund activities.

The most likely supporting revenues for capital financing will probably be gate fees, service charges, and land use fees. These revenues could support a variety of types of bonds. Lease revenue bonds, for instance, could be supported from charges. For most major solid waste financing, however, 1941 Act Revenue Bonds are the easiest and most marketable public bonds to issue.

1941 Act Revenue Bonds. Revenue bonds are supported from the revenues of an enterprise. These revenues can be either gate fees, lease payments, revenues from the sale of recovered materials, or any other revenue source specifically allocable to the enterprise.

Marketing revenue bonds require the preparation of complex trust documents (called indentures) which elaborate the terms of the revenue pledge, the use of bond proceeds, the segregation and management of revenues, and many other matters. These structures are not only difficult to set up but they also complicate operation. They require revenues pledged to bond service be accounted separately from any other revenues, and that the solid waste program be structured as an enterprise separate from other functions of an agency.

Using 1941 Act Revenue Bonds to build the processing station will require that the administering agency do two things. First, bonds must be presented to the voters for authorization. Authorization is by a 1/2 majority vote. Second, the financing plan for the processing station must be designed so as to reassure bond buyers of the security of supporting revenues. This security requires that the agency operating the station always has sufficient liquidity to meet bond obligations.

Liquidity sufficient to reassure bond buyers can be maintained in one of two ways. First, gate fees can be set high enough to always have excess money available. Bond buyers normally evaluate this excess revenue in terms of the ratio of net revenues from charges (minus operating expenses) to annual bond service. This ratio is called the coverage. By pledging to set gate fees sufficient for a 2.0 coverage, bond buyers will be convinced of the security of the bond issue.

The second method of reassuring bond buyers is to maintain reserves high enough to cover bond service. The measurement of the adequacy of reserves is the ratio of reserves to annual bond service. This coverage by reserves must be maintained at least 2.0 to sufficiently reassure bond buyers.

Coverage by reserves is the best method of establishing the security of bonds for capital intensive projects such as transfer stations, processing

stations and energy recovery/conversion facilities. Coverage by reserves is advantageous for several reasons. First, once the reserves are accumulated, gate fees can be lowered. And second, revenues from the sale of recovered materials can contribute to reserves.

Revenues from the sale of recovered materials are, at this time, uncertain. If they are pledged to supplement reserves, the solid waste enterprise only indirectly relies on these revenues. While the projected gate fee may, for planning purposes, be sufficient to maintain reserves at a 2.0 coverage, actual revenues from the sale of recovered materials may enable actual gate fees to be reduced.

Leasing. Leasing, a financing device commonly used for private capital formation, is being used more and more to finance capital work in the public sector. Private companies use leasing primarily as a device to turn capital expenses into operating expenses, thus, reducing taxable income. In the public sector, leasing's major advantage is avoiding debt elections and, less importantly, debt restrictions. Lease payments are financed out of current revenues and as long as current revenues are adequate to meet lease payments, a local agency can avoid the expense and delay of bond elections.

Local agencies lease facilities from public or private sources. In recent years, California local agencies have made extensive use of non-profit corporation leaseback arrangements explained below. Leasing from private sources differs from a non-profit corporation leaseback in that no bonds are issued.

California local agencies have used two basic lease forms: lease-purchase and true lease agreements. A lease-purchase contract is a year-to-year renewable contract which enables a local agency to assume title to the leased property at the completion of the term of the lease. A true lease, on the other hand, has no title transfer provisions. Lease payments do

not in any way build equity in the leased property. Title transfers to the local agency only upon payment of a fair market price for the property.

The choice of a true lease versus a lease-purchase depends upon two factors: 1) the relative cost, and 2) final ownership. Lease payments are quite sensitive to the tax benefits accorded the lender. A local agency should compare the relative cost of true lease versus lease-purchase to be assured that the final lease has the lowest available cost. Cost will be tempered by the agency's desired regarding final ownership. Where final ownership by the local agency is mandatory the local agency must choose a lease-purchase agreement.

Private leasing to public agencies has been used for short-term or medium scale projects in California, such as transport equipment. It has not been used for large scale long-term contracts. Constitutional and statutory restrictions on borrowing by local agencies have made private lenders reluctant to commit large amounts of capital in leasing to public agencies. Private lenders are wary of entering into the type of lease agreements permitted local agencies where large amounts of capital are at risk.

Private financing. Private participation in financing and operating the processing station can range from complete equipment and service contracts to service contracts only. This range of participation allows considerable flexibility in processing station financing and operation through private enterprise. A necessary aspect of any private participation will be some public monitoring. At a minimum, public action will be needed to guarantee that the processing stations receive solid waste. This action is especially necessary because gate fees at the processing stations may exceed existing landfill gate fees. Public supervision once the waste stream is assured can vary considerably. A public authority may be necessary to regulate gate fees to assure equal treatment of all collectors using a station. Some regulation may be

required to specify the plan and equipment to be used at the station.

In California, the State may issue tax exempt bonds for private pollution control facilities. These were authorized by constitutional amendment in 1972. The California Pollution Control Financing Authority (CPCFA) was formed as the implementing agency to process applications, issue, and pay bonds. Bond proceeds are available to borrowers to build or install pollution control facilities. Projects must be certified by one of three agencies: 1) the State Water Resources Control Board, 2) the State Air Resources Board, and 3) the Resources Agency.

Up to now, solid waste projects have had low priority for CPCFA money. One recently introduced bill may increase the priority of solid waste projects for CPCFA bonds. This bill is AB 2126 introduced by Assemblyman John K. Knox.

Reserves. Reserves, or pay-as-you-go monies, are useful for small capital projects. Accumulating reserves requires careful planning of the timing and amount of expenditures.

Lease-revenue bonds. Lease-revenue bonds are difficult to issue. They require a public commitment to lease payments without an authorizing vote. If the ultimate support for these bonds is gate fees, then their financing requirements would be almost identical to 1941 Act Revenue Bonds. Lease-revenue bonds can be supported through payments from the general fund of a public agency. Such general fund support may be necessary to augment revenues from gate fees. Lease-revenue bonds are difficult to market because bond buyers find them difficult to understand.

In Conclusion. The most straightforward, least costly, and most marketable method of financing major solid waste capital expenditures is 1941 Act Revenue Bonds. These bonds do require special coverage provisions to assure marketability. Where capital expenditures are minor, accumula-

tion of reserves provide the best method of financing. With small ongoing capital expenses, such as transport equipment, leasing is also a desirable financing method.

Remote City Of Sacramento Landfill

The intent of this study is to evaluate the costs of the City of Sacramento for a replacement landfill site. The existing site is a landfill site. For the purpose of this analysis it is assumed that a new landfill location would cause a minimum increase in the city cost of 10 million. This would increase the city's ability to collect a fee of \$100 per ton to increase from \$100.

ASSUMPTION CONCERNING THE EXISTING SYSTEM

Total waste tonnage available per day

= 1,000 tons (1)

A1. Collection time available with 3 trucks/day

= 100 tons (1)

B1. On route time (from to landfill, disposal to road, etc.) for 2 trucks/day

= 100 tons (1)

(1) Source: Census, City of Sacramento

Appendix

K

Remote City Of Sacramento Landfill

The intent of this study is to evaluate the cost impact to the City of Sacramento for a replacement landfill after closure of the existing city landfill site. For the purpose of this analysis it is assumed that a new landfill location would cause a minimum increase in one way haul of 15 miles. This would decrease the time available for collection of each route due to increase haul time.

ASSUMPTION CONCERNING THE EXISTING SYSTEM

Total route time available per day

= 420 min. ⁽¹⁾

A) Collection time available with 2 loads/day.

= 320 min. ⁽¹⁾

B) Off route time (haul to landfill, disposal breaks, etc.) for 2 loads/day

= 100 min. ⁽¹⁾

(1) Source - Gennis, Gray & Justice

Average crew size = 3⁽¹⁾

Trips to disposal = 2 per day vehicle⁽¹⁾

ASSUMPTIONS CONCERNING THE PROPOSED SYSTEM

Time involved in haul due to increased haul miles is based on:

- A) A velocity of 35 mph for the increased haul is assumed; and
- B) The increased haul miles are assumed to be 15 one-way haul miles.

ANALYSIS

(15 miles) (2 way) = 30 miles increase in haul/trip

$$\frac{30 \text{ miles}}{35 \text{ mph}} = 51 \text{ min. increase haul time}$$

Adjusted allowable collection time

	<u>1 disposal trip</u>	<u>2 disposal trips</u>
Total Time ⁽¹⁾	420 min	420 min
Off route time ⁽¹⁾ (includes existing haul)	50 min	100 min
Increase Haul time	51 min	102 min
Available collection time	319 min	218 min

The affects on existing time usage for collection, haul and disposal are changed with the increase in haul due to a new remote landfill. These changes of time usage are presented in Figure K-1. For a typical existing collection route with 3 man crew, two trips to the landfill site can be maintained even after adjusting the maximum allowable collection time to 218 minutes due to an increase in haul time of 102 minutes.

Haul time for existing landfill site

From waste system economics by collection service area (Aug. 7, 1975)⁽²⁾ the weekly haul miles for the City of Sacramento were calculated to be 5,550 miles to 51 routes.

(2) - A Sacramento County Solid Waste Management Division staff study.

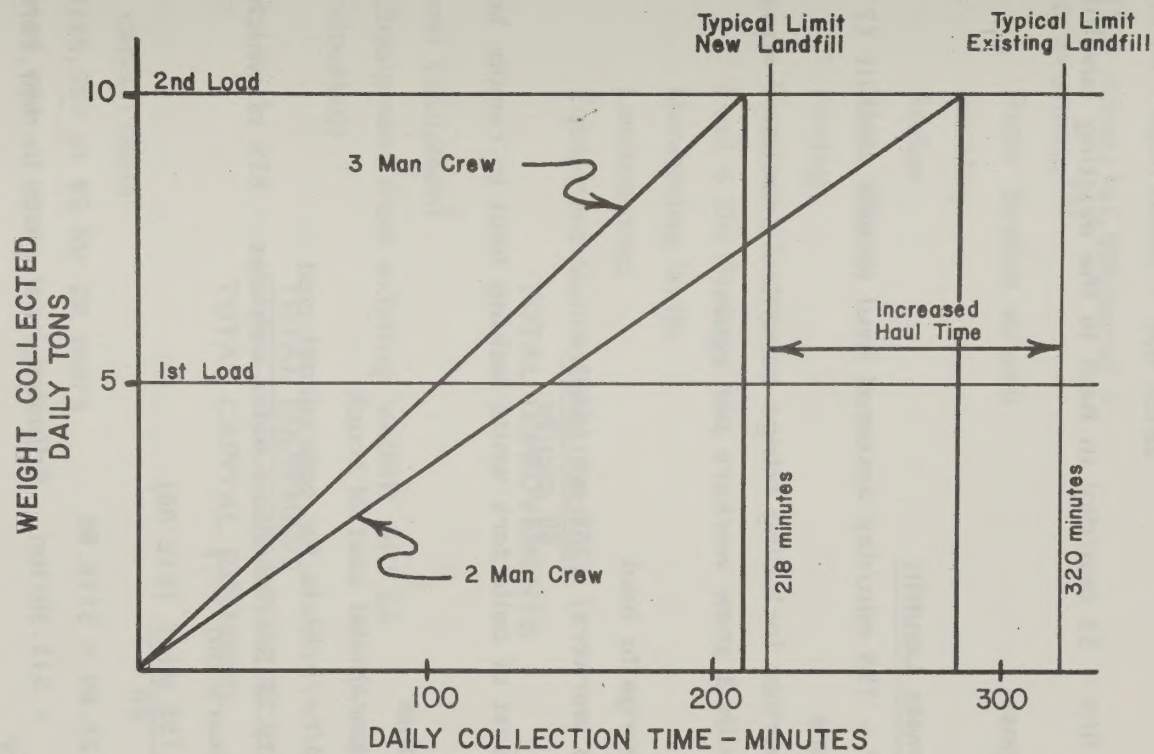


PLATE K-1
CREW AND EQUIPMENT UTILIZATION

$\frac{5,500 \text{ miles}}{(51 \text{ routes}) (5 \text{ days})} = 22 \text{ miles/day}$ Existing haul miles/day/route assumed

velocity within city = 25 mph

$\frac{22 \text{ mi/day}}{25 \text{ mph}} = 0.88 \text{ hrs} = 53 \text{ min/day}$ in haul to the existing landfill

for 2 trips to disposal

Haul Costs for Remote Landfill

53 min + 102 min* = 155 min/day assumed haul to new landfill (2 trips)

*Increased haul time

Wages per crew worker including fringe benefits as assumed equal to \$12.00 per hour with 3 crew workers per route.

Personnel costs charge to haul

$$= (\$12.00) (3 \text{ workers}) \frac{(155 \text{ min/day})}{60 \text{ min/hr}}$$

= \$93/day cost of collectors while making haul to remote landfill site

Total haul costs/route

= \$93.00 + operational cost of truck

Use \$10.00/hr/vehicle for operational cost

(due to City of Sacramento's older vehicles - 85% of which are over six years old⁽¹⁾.)

$$= \$93.00 + \frac{(155 \text{ min})}{60} (\$10.00)$$

$$= \$93.00 + \$25.80 = \$118.80$$

$\frac{\$118.80}{10 \text{ tons/day}} = \$11.90/\text{ton}$. Adjusted haul costs to new remote landfill site

NOTE: This haul cost is based on use of the present collection equipment. The use of larger vehicles could reduce haul to the remote landfill to one trip per day.

COSTS OF A NEW REMOTE LANDFILL

Land costs - \$1,000/acre based on estimate from Sacramento County
Real Estate Division

Min landfill requirement - 500 acres

(500 acres) (\$1,000/acre) = \$500,000

Site Improvements⁽³⁾

Water System w/well	50,000
Fencing	20,000
Scales	30,000
Scale House	15,000
Paving	30,000
Employee facilities	50,000
Fuel & Oil Storage	3,000
Monitoring Wells	5,000
Landscaping	15,000
Equipment Maintenance Facility	30,000

TOTAL IMPROVEMENTS \$748,000

Additional Equipment \$100,000

(Equipment from existing landfill will be
relocated)

TOTAL EQUIPMENT \$100,000

TOTAL CAPITAL REQUIRED \$848,000

Annual capital costs.

\$748,000 at 8% for 20 years

\$100,000 at 8% for 8 years

0.1018 5221 - 8% at n = 20

0.1740 1476 - 8% at n = 8

	<u>Annual \$</u>
(\$748,000) (0.1085221) =	\$ 81,175
(\$100,000) (0.17401476) =	\$ 17,401
(\$143,911) (\$1.20) Operating costs =	<u>\$172,693</u>
	\$271,269

(3) Costs based on County projects of similar type.

$$\frac{\$271,269}{143,911 \text{ tons}} = \$1.88/\text{ton}$$

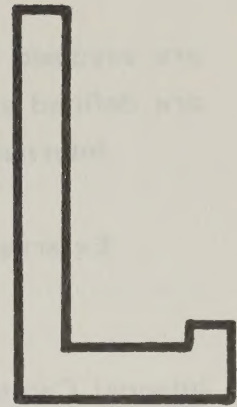
(Assume disposal rate is equal to \$2.00/ton)

CONCLUSION

The costs relating to the remote City of Sacramento landfill are estimated to be \$11.90/ton for haul and \$2.00/ton for disposal. The remote landfill would require capital expenditures of \$848,000 to cover the costs of land, site improvements and equipment. These capital costs are included in the disposal rate of \$2.00/ton. The haul costs of \$11.90/ton are based on the present collection system using existing equipment. The use of larger collection vehicles could reduce the costs related to haul.

These cost data are used in Chapter 8 Financial Analysis of Alternatives.

Appendix



City Of Sacramento Transfer Station

CITY OF SACRAMENTO TRANSFER STATION

After 1980 the landfill now serving the City of Sacramento will be exhausted. An appropriate alternative for the city to consider as a disposal replacement is a transfer station which would transfer the city waste to a remote landfill. The following analysis considers the cost impact of an alternative of this type.

Other alternatives such as developing a new disposal site within the city limits do not appear to be feasible at this time. It is likely that intense urban growth would prohibit finding an acceptable close-in disposal site, but direct haul to an existing or new landfill could still be an alternative at this time.

The analysis computes both internal and external costs for a transfer station to serve the disposal needs of the City of Sacramento. The cost analysis is based on the disposal needs for the City of Sacramento which

are assumed to be 143,911 tons/year for the year 1980. These costs are defined as follows:

Internal Costs: Those costs which apply directly to operations of the facility and not associated with haul.

External Costs: Those costs which apply directly to hauling of the material away from the facility.

Internal Capital Costs. (Station Costs)

Station capital costs: \$1,375,000

This assumes a station similar to the northeast station in size and design. (See Chapter 9 for cost breakdowns.)

If:

$n = 20$ years

$i = 8\%$

Then capital amortization is \$140,047 per year.

Internal Operating Costs

Station operating costs were derived as follows:

Personnel Requirements	Annual Salaries
2 - Equipment Operators	\$ 41,141
1 - Supervisor I	\$ 23,837
1 - Crew Worker I	\$ 18,512
2 - Crew Worker II's	\$ 39,354
1 - Scale Attendant	\$ 17,846
Internal Personnel Costs	\$ 141,690

It is assumed that about 55% of the total operating (internal) costs go to pay wages and benefits for employees of the station. The remaining 45% cover all other internal operating costs. Therefore, the internal costs are \$257,618 per year.

The total internal costs are therefore:

Capital \$140,047

Operating \$257,618

\$397,665

\$397,665 = \$2.76/ton

143,911 tons

External Costs (Transport)

From the present city landfill location to the County landfill is a one-way haul of 25.4 miles. Other landfills such as the regional site in Yolo County could be used as well. The Yolo site has a one-way haul of over 18 miles with a commercial rate of \$2.25/ton. However, this alternative assumes that the County landfill will be used.

The following calculations determine the required number of haul vehicles:

141,911 tons = 555 tons/day

260 days

555 tons/day = 31.71 say 32 loads/day

17.5 tons/load

25.4 miles at 45 mph = 0.56 hours of haul (one way)

(32 loads) (0.56 + 0.56) = 35.84 hours (haul time/day)

Total Transport Time/Day

(trailer change time = 0.10 hours) x32 = 3.2 hours

(unload time = 0.33 hours) x32 = 10.67 hours

Recap:

Loads	Haul Time	Trailer Change	Trailer Unload	Total Time
32	35.84	3.20	10.67	49.71 hours

Therefore: at 8 hours per truck

$\frac{49.71 \text{ hours}}{8 \text{ hours/truck}} = 6.21 \text{ trucks}$ say 7 trucks

8 hours/truck

Thus 7 tractor-trailer units will be required for haul.

The transfer station will have 2 bays for loading thus 2 extra trailers and one yard tractor will be required.

Equipment requirements are therefore as follows:

<u>Tractors</u>	<u>Trailers</u>
7	7
1 yard	2 bays
<u>1 spare</u>	<u>2 spares</u>
9	11

Tractor costs (9 units) (\$25,000/unit) = \$225,000

Trailer costs (11 units) (\$30,000/unit) = $\frac{\$330,000}{\$555,000}$

TOTAL Equipment
(External) Capital
Costs

Capital amortization is then as follows:

Annual \$, \$96,578

for:

n = 8 years

i = 8%

External Operating Costs

1) Costs of trailer operation \$0.157/mile

(35.84 hrs.) (45 mph) (\$0.157/mile) = \$253.21
haul time

- 2) Costs of tractor operation
 $\$6.45/\text{hr. of engine time}$
 $(49.71 \text{ hrs.}) (\$6.45/\text{hr.}) = \320.63
 total time
- 3) Wages (Shift time)
 $\$10/\text{hr. including benefits}$
 $(7 \text{ tractor-trailer units}) (8 \text{ hours}) = 56 \text{ hours}$
 $(56 \text{ hours}) (\$10/\text{hr.}) = \560

Total operating costs for external equipment

\$ 253.21		
\$ 320.63		
\$ 560.00	$\$1,133.84$	$= \$2.04/\text{ton}$
$\$1,133.84/\text{day}$	555 tons	

Recap of All Costs

A recap of these calculated costs are restated as follows:

Internal Capital	\$140,047 /yr.
Internal Operating	\$257,618 /yr.
	\$397,665 /yr.

$$\frac{\$397,665}{143,911 \text{ tons}} = \$2.76/\text{ton Internal}$$

External Capital	\$ 96,578 /yr.
External Operating	\$293,578 /yr.
	\$390,156 /yr.

$$\frac{\$390,156}{143,911 \text{ tons}} = \$2.71/\text{ton External}$$

\$2.76

\$2.71

$\$5.47/\text{ton}$ Transfer Cost for City Transfer Station
 (Does not include disposal costs)

Conclusion

This analysis concludes that the cost of a transfer station to the City of Sacramento would be a unit operating cost of \$5.47/ton with the capital requirement of \$1,930,000 (1975 dollars) for construction and rolling stock. In addition to this the City of Sacramento would be charged

\$1.50 (the existing disposal rate per ton) for each ton transferred to the County disposal site which, with the present rate, would raise the operating cost to \$6.97/ton.

Wages (2007 rates)	\$ 222.21
Electricity (2007 rates)	\$ 120.43
Gas (2007 rates)	\$ 380.00
Total operating costs for external adjustment	\$1,732.55/day

Recap of All Costs	
A recap of these calculated costs are listed as follows:	
Internal Capital	\$197,917 tons
Internal Operating	\$230,156
External Capital	\$2,570,156
External Operating	\$2,570,156
Total	\$5,568,385

Transfer Cost for City Transfer Station
(Does not include disposal costs)

Conclusion
This analysis concludes that the cost of a transfer station to the City of Sacramento would be a unit operating cost of \$2.57/ton with the capital requirement of \$2,570,156 (1982 dollars) for construction and rolling stock. In addition to this the City of Sacramento would be charged

Appendix

M

Comments And Responses To The EIR

COMMENTS AND RESPONSES

The following section includes all of the written comments received during the draft EIR review period and staff responses to those comments.

State of California

Department of Health

Memorandum

To : Health & Welfare Agency
Attention Assistant to the Secretary, Operations
915 Capitol Mall, Room 200
Sacramento, California 95814

Date : November 5, 1975

Subject: SCH NO 75102701
Sacramento County Solid
Waste Management Plan

From : Kenneth Buell, Manager
Environmental Health Services Branch

The final County Waste Management Plan has not yet been written. The Draft Environmental Impact Report, Control No. PW-75-103, is a preliminary. We are reviewing the plan, along with the Solid Waste Management Board, and are making comments for change to Sacramento County. We feel that the EIR at this time is premature.

RESPONSE TO COMMENT 1

The CEQA Guidelines require preparation of the EIR "...as early in the planning process as possible to enable environmental considerations to influence project program or design" (Administrative Code Sec. 15013). "To the extent possible, the EIR process should be combined with the existing planning, review, and project approval process being used by each responsible agency. The lead agency shall include the EIR as a part of the regular project report where such a report is used in the existing review and budgetary process" (Administrative Code Sec. 15086). "The EIR may be prepared as a separate document, or as part of a project report. If prepared as a part of the project report, it must still contain in one separate and distinguishable section the elements required of an EIR..." (Administrative Code Sec. 15061(d)).

In light of the above, Comment 1 would appear to be inappropriate.

State of California

The Resources Agency of California

Memorandum

To : L. Frank Goodson
Project Coordinator
Resources Agency

Date: November 10, 1975

From : Energy Resources Conservation
and Development Commission
455 Capitol Mall, First Floor
Sacramento, 95814

Subject: Comments on Draft EIR for the Sacramento County Solid Waste
Management Plan, SCH #75102701

General Comments

Section 21100(c) of the Public Resources Code and Appendix F of Title 14, Division 6, of the California Administrative Code (Resources Agency Guidelines) require an environmental impact report to contain: "Mitigation measures proposed to minimize the impact including but not limited to measures to reduce wasteful, inefficient, and unnecessary consumption of energy." Energy mitigation related to either alternatives to the project or alternative methods of design and construction of the project was not discussed in this report.

While it is stated on page 1 in the introduction to the EIR that the Sacramento County Solid Waste Management "Plan is a conceptual document /and/ the EIR must too be on that plane", discussion of energy-related mitigation measures cannot be ignored.

Additional Information Needed

Compliance with Section 21100(c) of the Public Resources Code is required. Discussion of such factors as the potential increased or decreased energy consumption resulting from the establishment of the nine major facilities that the recommended plan dictates. This would include, for example, fuel consumption from increased number of trucks travelling to and from facilities, increasing frequency of disposal of waste, and the increased fuel consumption by waste collection vehicles that would occur as a result of placing facility locations at a greater distance from population centers.

Loyd H. Forrest

Loyd H. Forrest
Executive Director
(322-4774)

KH:nwb

M-4

RESPONSE TO COMMENT 2

Energy related mitigation measure have been incorporated in the final EIR.

State of California

THE RESOURCES AGENCY

Memorandum

To : Mr. L. Frank Goodson
Projects Coordinator
The Resources Agency
Resources Building, 13th Floor

Date: NOV 20 1975

In Reply Refer
To: 420:GH

From : STATE WATER RESOURCES CONTROL BOARD
DIVISION OF PLANNING AND RESEARCH

Subject: REVIEW OF NOTICE OF INTENT SCH 75102701
Sacramento County Solid Waste Management Plan

We have reviewed the draft of the County of Sacramento Solid Waste Management Plan, Volume 1.

We feel that continuous compliance with the waste discharge requirements adopted by the Regional Board for the six disposal sites presently in operation in Sacramento County will adequately protect the beneficial uses of groundwater and surface waters.

The search for a Class I Site to receive toxic and hazardous waste should be vigorously pursued to eliminate the problems that would arise if the Class I Site, located in Contra Costa County, could no longer accept Sacramento County Class I waste.

The need for a Class I Site would be magnified if the program, being considered by the State Water Resources Control Board, to control pollution sources that discharge heavy metals and hazardous materials into community sewage treatment systems, is implemented.

Source control is a condition in all clean water grant contracts for treatment plants treating 5.0 mgd or more of community sewage. Sacramento County is participating in this program.

We suggest the following modification of the draft:

On pages 8 and 9, the section on geologic and soil conditions and hydrologic conditions is very sketchy and misleading. There are geologic conditions at existing sites that could pose a threat to water quality with improper management.

At the top of page 2-4, under special waste, the second item, should include handling of toxic and hazardous wastes.

On page 2-6, under specific objectives, another item should be added to include Class I wastes and high liquid content wastes.

NOV 20 1975

On page 3-4 and 3-5, under the section on geology, the last sentence on page 3-5 should read as follows: "The Great Valley Province is a large structural basin which has become filled with sedimentary rock and unconsolidated sediments containing substantial quantities of groundwater."

The last paragraph under hydrology on page 3-6 is very misleading. Although it may be true that only a relatively small portion of the land area in Sacramento County provides natural surface water percolation recharge areas for the groundwater body, there are substantial areas of moderately permeable material which provide substantial recharge to the groundwater body through deep penetration of excess applied irrigation water and precipitation. Much of this type of land lies to the east of Sacramento and south of the American River.

To the top paragraph on page 3-2, add the phrase: "...and toxic" (after hazardous). Also, do the same on page 3-21 under item (4).

On page 6-2, plate 6-2 add the area or site which is handling the hazardous toxic waste generated in the county and the injection well at the Aerojet General Industrial complex.

To the top of page 6-7, after leachate add: "...or gases". Then on the next sentence at the end after the word "system" add "...in compliance with minimum standards adopted by the State Water Resources Control Board under Subchapter 15 of the California Administrative Code".

At the top of page 6-36 add a section describing discharge requirements adopted by the Regional Water Quality Control Board and the type of classification given to the Sacramento County site.

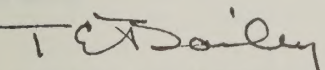
Under the City of Sacramento disposal site, at the bottom of the last paragraph after the date: "As a Class II-2 site for low moisture content, nontoxic materials only..."

On page 6-67 after the first paragraph some mention should be made of the deep-well injection system on Aerojet General property for disposal of industrial waste.

At the top of page 7-15 add the words "toxic and..." before hazardous.

On page 7-19, after the first problem add the following: "...As new requirements are established on wastewater treatment plants, source control of toxic materials will be required. Such control will increase the quantities and varieties of toxic substances that must be managed by the solid waste disposal system."

On page 8-49 bottom of the page add: "toxic and..." before hazardous.



THOMAS E. BAILEY, Acting Chief
Division of Planning and Research

RESPONSE TO COMMENT 3

All technical and editorial comments have been reviewed and incorporated into the final draft plan and EIR.

State of California

The Resources Agency

Memorandum

To : Honorable Claire T. Dedrick
Secretary for Resources
1416 Ninth Street, Room 1311
Sacramento, California 95814

Date: November 21, 1975

From : Department of Fish and Game

Subject: ES - Project and Environmental Impact Statement Review and Comment - SCH 75102701 -
Sacramento County Solid Waste Management Plan

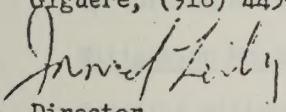
The Department of Fish and Game has reviewed the draft EIR for the Sacramento County Solid Waste Management Plan (SCH 75102701) and has the following comments:

The report presents a conceptual plan, and detailed impacts on fish and wildlife resources are not discussed. The plan does not describe specific disposal or transfer sites, and without this information the effect on fish and wildlife cannot be readily assessed.

The report indicates that additional EIRs on each proposed site will be forthcoming, and at that time, we should have an opportunity to better assess the impacts upon fish and wildlife resources.

We are concerned, however, that plans for one transfer site have apparently proceeded to a near-construction stage without benefit of proper environmental review. We refer to the Walnut Grove transfer site which, according to the EIR, is approved and funded and would be operational in 1976. Our field personnel report that a site has already been selected for this project. Location of the facility at the selected site could possibly result in degradation of water quality in nearby waterways. We recommend that an EIR be prepared for this specific project before any development takes place.

Questions regarding this Department's concern may be directed to our Region 2 headquarters, 1001 Jedsmith Drive, Sacramento, California 95819, attention Paul Giguere, (916) 445-0370.


FOR Director

DEC-4-1975
C. L. Lively
RECEIVED

All transfer stations and other major facilities will be subject to environmental assessment as required by CEQA prior to implementation.

State of California

THE RESOURCES AGENCY

Memorandum

To : Honorable Claire T. Dedrick
Secretary for Resources
1416 Ninth Street, Room 1311
Sacramento, CA 95814

Date : December 4, 1975

From : STATE SOLID WASTE MANAGEMENT BOARD

Subject: SCH 75102701, Draft EIR, Sacramento County Solid
Waste Management Plan, Sacramento County

We have reviewed the draft EIR and have the following comments:

We agree that it is not the purpose of this EIR to assess all the environmental impacts for the specific project facilities shown in the county solid waste management plan. Detailed environmental assessments of specific facilities should be made at the time the facilities are being considered for construction.

Description of Project - Pages 4 and 5.

We believe the major changes in controlling storage and collection of solid waste should be more clearly identified.

Environmental Setting and Impact - Pages 5 to 9.

Hazardous Waste. The impact of hazardous waste transport and disposal has not been included.

Atmospheric Conditions - Pages 6 to 8.

The impact on air quality resulting from the disposal of agricultural wastes by burning needs to be included in this section.

Mitigation Measures Proposed to Minimize the Impact - Pages 14 and 15.

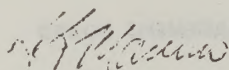
Specific mitigation measures, where necessary, are not presented as being part of the proposed plan. In most cases the described measures are only proposed as possible project features. It should be stated that mitigation measures will be required.

Adverse Environmental Effects Which Cannot Be Avoided if the Recommended Plan is Implemented - Pages 12 and 13.

The loss of those resources found in the solid waste disposed of in landfills is an adverse environmental effect which cannot be avoided until resource recovery is feasible.

We recommend the relationship between solid waste, water and air quality programs regarding areas of mutual impacts be discussed in the final EIR.

If you have any questions regarding our comments, please contact Herb Iwahiroy at (916) 322-3330.


Albert A. Marino
Executive Officer

RESPONSE TO COMMENT 5

The responsibility for control of storage and collection of solid waste is assigned to various local jurisdictions. There are no major changes anticipated in the area of storage and collection.

There is no hazardous waste program in effect in Sacramento County.

The plan recommends that such a program be promulgated. An analysis of hazardous waste transport and disposal will evolve from this effort.

Chapters 5 and 6 deal with the problems associated with hazardous waste in Sacramento County.

All agricultural waste in Sacramento County are returned to the soil or burned. The impact can be significant depending on weather conditions. There are no proposals in this planning document which would have any impact on air quality resulting from the burning of agricultural waste.

Mitigation measures are not specific because the sites of facilities have not been determined. Each project will require an EIR with specific mitigation measures prior to implementation.

The relationship between solid waste, water, and air quality programs are discussed in Chapter 5.

State of California

Memorandum

To : Mr. Ronald Robie, Director
Department of Water Resources
1416 Ninth Street
Sacramento, CA 95814

Attention Ken Fellows

Date : December 29, 1975

Subject: Draft Environmental Impact
Report for the Sacramento
County Solid Waste
Management Plan

(SCH 75702701)

From : Air Resources Board
Harmon Wong-Woo, Chief
Div. of Implementation & Enforcement

Harmon Wong-Woo by RP

The following is our comment on the Draft Environmental Impact Report of
Sacramento County Solid Waste Management Plan:

Comment: The energy resource recovery portion of the plan should discuss
the need for emissions from any facility to comply with the reg-
ulations of the Sacramento County Air Pollution Control District.

RESPONSE TO COMMENT 6

Specific engineering and emissions control information will be provided in the site specific EIR which will be prepared on individual projects if it is determined they have the potential for significant effect.

State of California

The Resources Agency

Memorandum

To : Honorable Claire T. Dedrick
Secretary for Resources
1416 Ninth Street, Room 1311
Sacramento, California

Date :

File No.: SCH 75102701

From : The Reclamation Board

Subject: Sacramento County Solid Waste Management
Plan Draft Environmental Impact Report

As far as we can determine this draft Environmental Impact Report is adequate.

We note that the summary page of adverse environmental effects does not include odor. It seems to us that odor is difficult to eliminate in an operation as large as this. We believe it could be significant and should be included.

This report appears to be well organized and well written.

From the maps in the report it does not appear that the project will affect or be affected by any existing or proposed flood control project known to us. However, should further planning result in the location of collection stations or other solid waste management facilities within a floodway or adjacent to a levee the approval of The Reclamation Board is required prior to construction.

P. C. Walters
P. C. WALTERS
Chief Engineer and
General Manager

RESPONSE TO COMMENT 7

The EIR discusses odor and aesthetic problems under the heading Aesthetic and Nuisance Conditions.



CITY PLANNING COMMISSION

December 2, 1972

Honorable
County of Sacramento
Department of Public Works

Public Works Department
3220 Broadway Lane
Sacramento, California 95817

Dear Mr. [Name]:

The Draft EIR for the Sacramento County Public Works Department
distributed to the City Planning Commission at [Date].
The City State has reviewed the Draft EIR and has enclosed a copy of the
report for your knowledge.

The City Planning Commission will review the Draft EIR at their regular meeting on
December 2, 1972 and you are invited to attend.

Respectfully,
[Signature]

Clifford Carter
Assistant Planner

CC: [Name]
Enclosures: [Number]



CITY OF SACRAMENTO

CITY PLANNING COMMISSION

915 "I" STREET SACRAMENTO, CALIF. 95814
CITY HALL - ROOM 308 TELEPHONE (916) 449-5604

JOSEPH AVENA
PLANNING DIRECTOR

December 5, 1975

Hilary Theisen
County of Sacramento
Department of Public Works
Solid Waste Management Division
9660 Ecology Lane
Sacramento, California 95827

Dear Mr. Theisen:

The Draft EIR for the Sacramento County Solid Waste Management Plan was distributed to the City Planning Commission at their October 28, 1975 meeting.

The City staff has reviewed the Draft EIR and have enclosed a copy of the staff report for your knowledge.

The City Planning Commission will review the Draft EIR at their regular meeting on December 9, 1975 and you are invited to attend.

Respectfully,

Clifford Carstens

Clifford Carstens
Assistant Planner

CC:vz
Enclosure

SACRAMENTO CITY PLANNING COMMISSION

City Planning Commission
Sacramento, California

Members in Session:

SUBJECT: Review of Draft EIR for the Sacramento County Solid
Waste Management Plan (M-87)

A copy of the draft EIR (Chapter 10 of the Sacramento County Solid Waste Management Plan - Volume I), was distributed to the Commission on October 28, 1975. The draft plan was subsequently modified by two addendums based upon discussion between County and City staffs.

The City staff suggests that the City Planning Commission recommend that the City Council approve the transmittal of the following general comments on this draft EIR. It is recommended that the final EIR should address the following points:

1. The State (A.B.1575) requires that energy conservation measures be included with the mitigation measures in an EIR. The following mitigation measure should be expanded: a) the proposed plan describes a total solid waste system but does not estimate the energy consumption for the system, and b) detail how transfer station and line hauls saves energy (EIR- Pg 13).
2. The draft EIR lacks current and in-depth analysis of population composition, location, and projections; solid waste generation by land use, quantity and future composition projections (Appendix B).
3. This draft EIR should be presented in a sequential progression and provide decision-makers with a useful tool to enable them to adequately evaluate the intended actions.
4. Expand the air quality section to include present quality, proposed standards and qualitative data to evaluate the transfer/processing stations impacts on the local airshed (EIR-Pg. 7).
5. Modify the noise section to eliminate meaningless measurements, cite testing procedures, distances, duration, exposure, frequency, health impact and establish the noise criteria for neighborhood acceptability (EIR-Pg. 10,11).
6. Estimate traffic volumes, anticipate for the transfer stations, on and off site traffic circulation, and model the activity on a per hour basis (EIR-Pg. 11).
7. Financial evaluation should be expanded to include inflation, a real demand for recycled material and operational cost (EIR-Pg. 12).

8. Describe how fencing, landscaping and berms will reduce odor, blowing particulate matter or blowing fugitive refuse, reduce noise and control vectors (EIR-PG. 14, 15).

9. Establish operational criteria for the transfer stations to be used as guidelines for development of specific sites.

10. Evaluate the long term cost impacts between the increase in gate fees, increase in personal transportation cost, and the possible closure of the stations resulting in the increase in illegal garbage dumping (Plan 9-42). This sequence of events conflicts with the Litter Control strategy proposed in the plan (Plan 6-45).

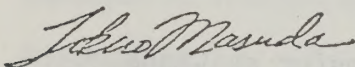
11. The alternatives should be explained in the draft EIR. CEQA (State Guidelines 15143-d) requires that one alternative discussed must be "no project." A brief comparison of the existing system's environmental impact and estimate cost with the alternatives would assist the decision makers in understanding the proposed actions.

12. Explain how the 90% efficiency of household separation is obtained (Plan F-22).

Mitigation measures not completely discussed are energy, noise, and air pollution reduction. Energy measures not discussed are efficient interior/exterior lighting, night operational hours because there is less energy demand, retrofitting older vehicles to be more fuel efficient, and building construction to reduce energy consumption. Noise is proposed to be reduced to acceptable levels but what are those levels and are the levels possible to achieve. Some of the air pollution mitigation methods such as turning off idling engines seems unrealistic. This procedure would use up more energy, causing more air and noise pollution than allowing the engines to idle.

The City staff finds that the draft EIR is not sufficient in three general areas: air and noise pollution, energy, and economics. The City staff recommends that the responses to these general comments, and the specific comments previously submitted by City Engineer Ron Parker on November 5, 1975, be incorporated into the draft EIR and Plan to develop a comprehensive and detailed final EIR and Solid Waste Management Plan.

Respectfully submitted,



Tokuo Masuda
Principal Planner

TM:bp
Attachment

M-87

December 9, 1975

Item No. 7

RESPONSE TO COMMENT 8

1. The request for expansion of the EIR in the area of energy consumption for the entire system appears to be an unreasonable demand to place on a conceptual planning document which fully recognizes the need for complete site-specific EIRs on a project basis for each facility.
2. Chapter 4 contains adequate demographic information for the purpose of this plan.
3. The EIR is organized as directed by Sacramento County Environmental Impact Report Guidelines in the conformance with CEQA.
4. Each facility for which it is determined there will be the potential for significant effect.
5. The noise measurements have been modified.
6. Traffic volumes and circulation are site-specific areas of concern which will be discussed in site-specific EIRs.
7. Inflationary Impacts are shown in Table 9-21.
8. Operation criteria will be developed on a site-by-site basis.
9. No comment
10. No comment
11. State Law (SB 5 1972) requires a plan; therefore, the "no project" option is not possible. However, a "no project" alternative has been incorporated.
12. No response

Appendix

N

Basic Resource Recovery Program

REPORT WITH RECOMMENDATIONS TO THE
SACRAMENTO COUNTY BOARD OF SUPERVISORS

CITIZENS ADVISORY COMMITTEE
FOR SOLID WASTE MANAGEMENT

January 14, 1976

Sacramento County
Board of Supervisors

Members in Session:

We, the membership of the Citizens Advisory Committee for Solid Waste Management, submit this report of findings and recommendations to the Sacramento County Board of Supervisors.

All Counties in California are required by State Law (SB 5, 1972) to submit Solid Waste Management Plans by January 1, 1976. The same legislation requires the inclusion of citizen and private sector representation in the planning process.

This committee is a group of concerned citizens of varied backgrounds appointed by the Sacramento County Board of Supervisors. Our job is to work with the Sacramento County Department of Public Works in the development of a Solid Waste Management Plan. Our function is to represent citizen interest and to insure citizen input.

We have been meeting weekly or bi-weekly from December 4, 1974 to the present.

We take this opportunity to state our appreciation to the Department of Public Works, Division of Solid Waste Management, for the hard work and effort they have put into the draft plan.

Mrs. Marian D Jones

Marian Jones
Chairperson

MJ:dss

cc: City Councils: Sacramento
Folsom
Isleton
Galt

FINDINGS

540,420 tons of municipal refuse will be generated, collected, transported and disposed of in 1975, in the cities and unincorporated areas of Sacramento County. Waste generation in Sacramento urban areas is 1.04 tons per capita. There are projections for increasing waste tonnages from now to the year 2000.

Ratepayers and taxpayers throughout Sacramento County will pay over \$14,000,000 for solid waste management services in 1975. The City of Sacramento had a 23% rate increase this year. There was a 10% rate increase in the County service area. It is logical to assume that continued increases of refuse quantity will bring continued rate increases.

A sizeable percentage of the present municipal solid waste stream is made up of elements that are of proven or of potential economic value. Recovery of these elements would save dump space, preserve valuable non-renewable resources, and may bring an economic return at sale. (See Appendix 1)

Resource Recovery and the subsequent use of recovered materials has further benefits. Russell Train, Director of the Federal Environmental Protection Agency stated on December 3, 1973, at an Energy Conference sponsored by the Edison Electric Institute and the EPA, that "when two production systems are combined - one using virgin materials and the other recovered materials - the system using recovered materials causes less air and water pollution, generates less solid waste, and consumes less energy."

The State Solid Waste Management Board is clearly directing the Cities and Counties of California toward source reduction of waste and the recovery of resources from the waste stream by setting the goal of a 25% reduction of wastes entering landfills by 1980.

RECOMMENDATIONS

This Committee has studied many possible alternatives for dealing with the problems facing the people of Sacramento County with regard to Solid Waste Management. The Committee has centered its attention on the development of a plan that will provide for an efficient and effective solid waste system operating at reasonable cost.

The Citizens Advisory Committee Recommends:

That all levels of government should support measures that reduce the generation of solid waste.

That resource recovery become an integral part of the solid waste management system. Unnecessary waste must be eliminated. Waste costs money and burdens the environment.

The implementation of a Basic Resource Recovery Program in the Cities and Unincorporated area of Sacramento County. This program includes voluntary separation in the home of newspapers and mixed metals (ferrous and aluminum) and home collection of these items using the present collection system with some modifications. The City of Sacramento should give continued consideration to the Pilot Composting Program developed by City Staff. (Appendix 2) The Committee believes that citizens will support people intensive recycling if given a convenient opportunity, and if informed of the potential savings in costs, energy and resources their participation can bring.

The Basic Resource Recovery Program can be instituted immediately for a reasonable investment and will be a beginning step in the solution of problems concerning residential solid waste. A detailed cost analysis of this program will be included in the final plan.

The Citizens Advisory Committee is aware that some or all of its recommendations for resource recovery programs may involve increase in costs to homeowners of varying amounts. The CAC gives priority to those recovery programs that can be implemented at the least cost.

The Citizens Advisory Committee recommends that alternative 2B (Mechanical Processing) be given continued consideration. The committee, however, believes that the technical and engineering aspects of mechanical processing are not sufficiently known. The Committee recommends that the State, and not each major County in the State should undertake the design and evaluation of a workable economical recovery system. Such action would cut cost and share benefits.

Sacramento County should recommend to the State of California that the State Solid Waste Management Board undertake those steps necessary to finance, design, and build a workable prototype mechanical recovery facility that is economically viable in California.

County and City Staff should work closely together to locate a potential site for mechanical processing in Sacramento County and take necessary action to keep this option open for the future.

Appendix N-1

An Estimate of Value of the Recoverable Elements of Residential Refuse

Ferrous metals, aluminum, newsprint, and glass constitute 26.6% of the residential solid waste stream. Each element has a proven market value, as shown below.

Disposed at City Landfill 1974 - Residential Refuse 109,000 tons

6.4% is ferrous metals = current value \$20 to \$60 per ton
 $6.4\% \times 109,000 \text{ tons} = 6,976 \text{ tons} \times \$30 = \$209,280 \text{ element value}$

1.3% is aluminum = current value \$350 per ton
 $1.3\% \times 109,000 \text{ tons} = 1,417 \text{ tons} \times \$350 = \$495,950 \text{ element value}$

9.8% is glass (assume 75% salvable) = current value \$20 per ton
 $9.8\% \times 109,000 \text{ tons} = 10,682 \text{ tons} \times 75\% = 8015.2 \text{ tons} \times \$20 =$

$\$160,304 \text{ element value}$

9.1% is newsprint = current value \$15 per ton
 $9.1\% \times 109,000 = 9,919 \text{ tons} \times \$15 = \$148,785 \text{ element value}$

Resulting in Landfill Reduction of 28,994 tons

Returning at Current Market Value Combined Elements \$1,014,319

Disposed at County Landfill 1974 - Residential Refuse 147,100 tons

$\text{Ferrous Metals } 6.4\% \times 147,100 \text{ tons} = 9414.4 \text{ tons} \times \$30 \text{ per ton} = \$282,432$

$\text{Aluminum } 1.3\% \times 147,100 \text{ tons} = 1912.3 \text{ tons} \times \$350 \text{ per ton} = \$669,305$

$\text{Glass } 9.6\% \times 147,100 \text{ tons} = 14,145.8 \text{ tons} \times 75\% = 10,911.9 \text{ tons} =$
 $\$20 = \$218,238$

$\text{Newsprint } 9.1\% \times 147,100 \text{ tons} = 13,386 \text{ tons} \times \$15 \text{ per ton} = \$200,791$

Landfill Reduction 35,624.6

Current Market Value \$1,370,766



CITY OF SACRAMENTO

DEPARTMENT OF RECREATION AND PARKS

3520 FIFTH AVENUE

SACRAMENTO, CALIFORNIA 95817

TELEPHONE (916) 452-5681

SOLON WISHAM, JR.

DIRECTOR

November 5, 1975

MEMO TO: R. L. RATHFON, CITY MANAGER

SUBJECT: PILOT COMPOSTING PROPOSAL

Ms. Grace Ertel representing the Sacramento Branch of the American Association of University Women requested that the City initiate a pilot composting program which could provide mulch for community gardens. The request was referred to the City staff for a feasibility report. Personnel from the Waste Removal Division and Parks Division proceeded to gather data and investigate the proposal. Selected significant portions of a joint draft report are reproduced herein for your information and consideration.

A PILOT PROGRAM REPORT ON ORGANIC COMPOSTINGI. DATA COLLECTIONA. San Francisco

San Francisco's compost site is located on approximately three acres. This site is operated by two employees working part-time. The equipment used in conducting their composting program is: one each front end loader, one each Linding Shredder and one each dump truck. The front end loader and dump truck are also used for other purposes within the Street Tree Planting Division.

The materials used for composting are: brush clippings, grass clippings, sewage sludge, leaves, tree clippings, sawdust, sod weeds, and in some cases, spoiled produce and coffee hulls from various produce and coffee companies. No attempt is made to recycle household garbage.

The compost is hauled to the various gardens by city trucks. The city has made a greenhouse available for propagation of seedlings and supplies seedlings and/or seeds when requested.

The San Francisco project presently has twenty-two gardens with another twenty sites planned using both privately and city-owned lots. The gardens are used mostly for raising vegetables by elderly and low-income citizens to supplement their incomes. The program is also covered with a million dollar public liability and property damage insurance policy.

B. Chico

Chico's compost site is located on approximately ten acres at their municipal airport. This site is operated by two employees working part-time. The equipment used in conducting their composting program is: one each front end loader and one each Royer Shredder. The Royer Shredder has the advantage over the Linding Shredder which is used by the City of San Francisco in that it separates trees and litter from the compost. The front end loader used at Chico is also used for other responsibilities within the parks department.

Chico collects 2,600 cubic yards of leaves and grass clippings from their city streets during the months of October through December. This material is windrowed into a row of organic matter thirty feet wide, twelve feet high and three hundred feet long. This operation will produce approximately 500 cubic yards of compost in two years.

II. STRUCTURE OF A SACRAMENTO PROJECT

A. Program Description

A pilot program proposal could include all Department of Recreation and Parks organic output for a four month fall period. This organic matter would be from both the street tree and park maintenance operations. This is estimated to be 6,000 cubic yards of wood chips from street trees and approximately 3,000 cubic yards of leaves from park sites. This organic matter would generate approximately five rows of compost 30 feet wide, 12 feet high and 300 feet long. The compost period is approximately one year and a volume reduction of five to one is normal for the finished compost product. Each year the Sacramento project would produce one row of compost 30 feet wide, 12 feet high and 300 feet long or approximately 2,000 cubic yards.

At a later date studies can be conducted to determine the scope of utilizing all organic matter generated by the City of Sacramento garden refuse pickup (Street Cleaning Division) as well as total Department of Recreation and Parks organic matter production.

B. Site Selection

It is recommended that the pilot compost program be located on twenty acres of the existing City-owned landfill site located at 28th and C Streets. This area has already been landfilled by the City Waste Removal Division. This site is isolated from residential areas, has good access and is fenced.

C. Site Preparation

All literature recommends a good level (with drainage, no chuck holes, etc.) surface. Some site preparation would be required such as grading and installation of water.

D. Administration

A Sacramento pilot program should be administered by the Department of Recreation and Parks as this department will be the major generator of organic matter as well as a major user of the end compost product. The department also has personnel and facilities (i.e., greenhouse, gardening experience) which would lend compatibility to the project.

E. Potential Users

Possible Sacramento compost material users are as follows:

1. City of Sacramento Department of Recreation and Parks
 - a. Soil amendment for new park sites.
 - b. Soil amendment for annual beds.
 - c. Soil amendment for greenhouse and nursery operation.
2. Compost for community gardens.
3. Compost for general public.

III. COST OF PILOT PROJECT

A. Equipment

Dozer and/or road grader work	(Est. \$ 2,000)
One each Royer Shredder	
One each front end loader	
One each dump truck	(Est. \$35,000)

B. Personnel

Two equivalent men--could be made up of several part-time employees

One each Maintenance Man IV equipment operator	
One each Maintenance Man II truck driver	(Est. \$40,000)

C. Supplies

Miscellaneous supplies, insect sprays, rodent sprays, flyers, water	(Est. \$ 3,000)
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D. Total Cost Estimate

\$80,000

The staff report was written by Johnnie Bramble, Parks Division, and Paul Smilanich, Waste Removal Division. The joint report concluded that a pilot program such as the ones described above could operate successfully. The project was recommended for funding consideration.

A review of the full report and supporting data provides the following conclusions:

1. No attempt was made to determine a true cost/benefit ratio. The initial expense coupled with the recurring operating expense would make the end product compost material quite expensive on a per cubic yard basis (\$40 per cubic yard the first year and \$25 per cubic yard thereafter). The extended cost of space depletion in the City Dump is difficult to ascertain.
2. The Sacramento project proposal is developed on the basis of a small (2) sampling of composting projects which have operated for a short period of time. The amount of compost produced in San Francisco is small in comparison to Chico. The Chico program is new and has developed only projected amounts to date.
3. A Sacramento project would necessarily be limited to the use of vegetable matter from programs which control the source of material collected. This includes Tree Services and specific operations in General Park Services. Vegetable matter collected as part of the street cleaning function could not be used unless a major separation plant was constructed at the dump site.
4. A major composting project is feasible for the City using selected vegetable matter so long as initial set-up costs and operating expenses can be justified.

Solon Wisham, Jr.
SOLON WISHAM, JR.
Director

SW/mm

cc Ron Parker, City Engineer
Ms. Grace Ertel

APPENDIX N-3

BASIC RESOURCE RECOVERY PROGRAM

Developed by

CITIZENS ADVISORY COMMITTEE

TO

SACRAMENTO COUNTY'S SOLID WASTE PLAN

BASIC RESOURCE RECOVERY PROGRAM

This program is composed of several parts and places the major responsibility for system operation on the individual homeowner with major emphasis on home composting and home separation of recyclables. The program is defined in terms of the potential materials that are likely to be separated.

The CAC is aware that some or all of its recommendations for resource programs may involve increase in costs to homeowners of varying amounts. The CAC gives priority to those recovery programs that can be implemented at the least cost.

1. NEWSPAPER In those areas where home pickup of separated materials is not available it is recommended that citizens separate, store and deliver separated newspaper to a transfer station. The transfer stations are to be equipped with bins for receiving the material. Also, a study should be conducted to determine if other local areas such as supermarkets, schools, etc. should also be similarly equipped.
2. MIXED METALS (FERROUS AND ALUMINUM) Home separation of mixed metals is to be encouraged on a voluntary basis. Agencies now responsible for refuse collection will in addition to planning for separate collection of newspaper begin studying the effects of separately collecting mixed metals and implement when feasible. Transfer stations will be equipped to receive and store mixed metals delivered by citizens. Local areas will be studied such as supermarkets, schools, etc. to determine if they should be similarly equipped.
3. GLASS Homeowners are encouraged to separate glass and transfer stations should be equipped to receive separated materials delivered by citizens. Local areas such as supermarkets, etc. should be studied to determine if they should be similarly equipped.
4. COMPOST Separation and composting of yard waste in the household is encouraged on a voluntary basis. Home pickup of yard waste for use is also recommended. Outlet sources to be investigated for use of compost or shredded organic material derived from home collection and community composting are:
 - a) City and County Parks;
 - b) Freeway easements;
 - c) Community gardens;
 - d) Homeowners yard; or
 - e) Vacant lots (at request of owner)

5. PROCESSING AT TRANSFER STATIONS It is recommended that selected wastes at transfer stations should be separated either by hand or mechanically, whichever is most economical.
6. ECONOMIC INCENTIVES Economic incentives should be applied to those homes engaged in home separation of recyclables i.e. lower waste collection rates or cash receivable for materials delivered.

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